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SYRPHIDAE IN KENYA

Syrphidae, commonly called hoverflies or flowerflies, are one of the most conspicuous and interesting families of Diptera. Anyone who has visited a flowering garden on a bright sunny day may have noticed some members of this group. You often see them hovering apparently motionless until you approach, then darting rapidly off in any direction, only to return to exactly the same spot a few seconds later. You can also observe them visiting the selection of flowering plants, often present in large numbers and gently hovering from one flower to another, in order to take up their meal of nectar and pollen.

What makes them so attractive and conspicuous are the bright coloured markings on their abdomen, often as yellow or white spots and stripes. Syrphids have turned the phenomenon of mimicry into a real art and many people will have been fooled and mistook these harmless creatures for specimens of the more sinister wasps and bees.

Closer examination will show that Syrphidae belong to the family of true flies as they have only one pair of wings, the hind pair being reduced to small knob-like structures called halters. Hoverflies can be differentiated from other Diptera by the peculiar wing venation. In most species a 'vena spuria' or false vein is present. Actually it is a thickening of the wing membrane which does not connect to a vein at either end. Another noticeable feature is that some of the posterior veins form a false wing margin, running parallel with the true one (Fig. 1).

What Syrphidae do have in common with some bees is the fact that they are very beneficial insects for the gardener. Like the common honeybee, hoverflies have an important role as pollinators, showing some degree of flower constancy. Some species even visit reputedly wind-pollinated flowers.

If the larvae of hoverflies are less conspicuous that the adults, they show a greater originality and variety in their life histories. Several larvae (especially those belonging to the subfamily Syrphinae) prey on aphids. They have even been used as bio-control

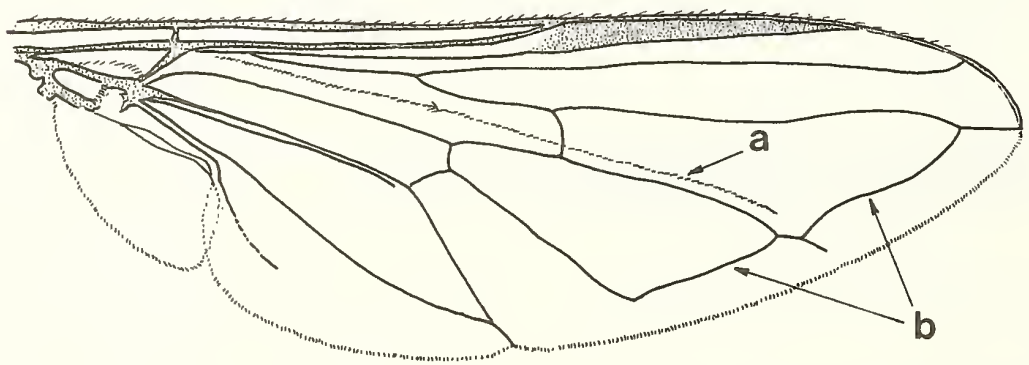

Figure 1: Generalised syrphid wing. a: vena spuria; b: false wing margin

agents to diminish the population of pest species of aphids: not surprisingly if you know that a fully grown larva can devour up to 50 aphids a day. Other species are not so welcome in the garden, like members of the genera *Merodon* and *Eumerus*. These flies attack some ornamental plants like Liliaceae and Amaryllidaceae, feeding on the food stored in the bulbs.

Other larvae are phytophagous or live in compost-like materials. Members of *Eristalis* and related genera are known as 'rat-tail larvae' because of the long, extensible siphon by which they can take up atmospheric oxygen while moving around in liquid or semi-liquid media. Still others are scavengers in the colonies of social Hymenoptera. Most remarkable in this respect is the genus *Microdon*. Larval members of this genus were first not recognized as dipteran larvae but were described as a mollusc because of their sluglike appearance. A similar type of larva is found in the genus *Trichopsomyia*.

Because of their striking appearance and agricultural importance, the family is better studied than some other dipteran groups. Nevertheless, not much is known about the Afro-tropical syrphid fauna in general, and Kenya in particular. In the catalogue of Afrotropical Diptera, about 500 species are mentioned from this region, of which about 75 are mentioned for Kenya. That this picture is largely incomplete was shown by a study performed in a rural garden in Kaptagat (20 km SE from Eldoret). During seven months (February to August 1992) syrphid flies were collected with white and yellow watertraps at two different sites in this garden. Over this period about 700 specimens were captured, belonging to 20 species. Of these, ten species were not previously recorded from Kenya. These new records are:

- *Eristalinus aeneus* (Scopoli, 1763)
- *Eristalinus dulcis* (Karsch, 1887)
- *Eristalinus mirus* (Curran, 1939)
- *Eumerus maculipennis* Bezzi, 1915
- *Eumerus serratus* Bezzi, 1915
- *Eumerus varipennis* (Curran, 1938)
- *Mesembrius lagopus* (Loew, 1860)
- *Metasyrphus corollae* (Fabricius, 1794)
- *Rhingia simicaerulea* Austen, 1893
- *Senaspis haemorrhoa* (Gerstaecker, 1871)

Undoubtedly, several other unrecorded species will be hovering around in many a garden.

Marc De Meyer, National Museums of Kenya, Dept Invertebrate Zoology, P.O. Box 40658, Nairobi, and Kennedy Maragia, P.O. Box 2144, Kisii

WHAT KILLED THE BONGO IN MAU?

The first complete specimen of the Bongo in East Africa was collected from the Mau forest in 1902 (Simon, 1965), and the species was commonly hunted in the bamboo forests of the Mau by trophy hunters, as early as the turn of this century (*e.g.* Roosevelt, 1909). The Mau Bongos represent one of three extant populations recorded in Kenya, the other two being on Mt Kenya and the Aberdares. Past reports indicate that the species once occurred in the Cheranganis where they may still be present, and Mt Londiani from which they have been eliminated, and today no other bamboo or montane forest area supports large numbers of Bongo (Hillman *et al.* 1988). This was not always the case. For example, numbers had built up substantially in the Mau during the 1950s, giving the area a reputation of supporting the largest

population of Bongos in East Africa (Simon, 1965).

Bongos are reputed to prefer bamboo forests in Kenya, although they occur in many areas which lack bamboo elsewhere in Africa, and bamboo does not grow in the Cherangani Hills where bongos once occurred (Stanley-Price, 1969). During 1991 and 1992, as part of Kenya Indigenous Forest Conservation Project (KIFCON), detailed mammal surveys were carried out in collaboration with the National Museums of Kenya and Kenya Wildlife Service, to assess, among other things, the current status of the Bongo in the bamboo and montane forests of Mau.

The three Forest Reserves surveyed (West Mau, Southwest Mau and Transmara) encompass about 18,500 ha pure bamboo stands, and a much larger area in which clumps of bamboo grow within a bamboo-scrub-grassland mosaic. Bongo footprints (width 60–80 mm) were recorded in or near two separate areas of bamboo forest (data in Dunn, 1992; Rueling *et al.* 1992), confirming that the species still occurs. This conclusion is supported by many interviews with Okiek Ndorobo hunters who have seen Bongo recently.

What is also clear, however, is that the Bongo numbers are low, and the beginning of this population decline can be traced back to an interesting report about Bongo deaths in the Mau in 1960 (Simon, 1962). During a brief survey by Tony Henley and Noel Simon several Bongo corpses were found, and the cause of death was attributed to the animals eating 'setyot' (*Mimulopsis solmsii*), a climbing shrub from the family Acanthaceae.

Along with at least three other species in the same family, this shrub has an unusual life cycle which involves gregarious flowering and fruiting by all plants in one year. Then, after the seeds have been dropped, all the adult plants die leaving a ghost-like understorey of dead shrub stems (*e.g.* Tweedie, 1965). The Okiek Ndorobo and Kipsigis people benefit during setyot flowering years (every seven to nine years) from bumper honey harvests, but the following year is a 'bad' year when, amongst other things, many old people are supposed to die (J. Mutangah, pers. comm.)!

Simon explains that the Okiek Ndorobos consider the setyot shrub as poisonous to Bongo in the second year of its life-cycle (*i.e.* when the shrubs are growing

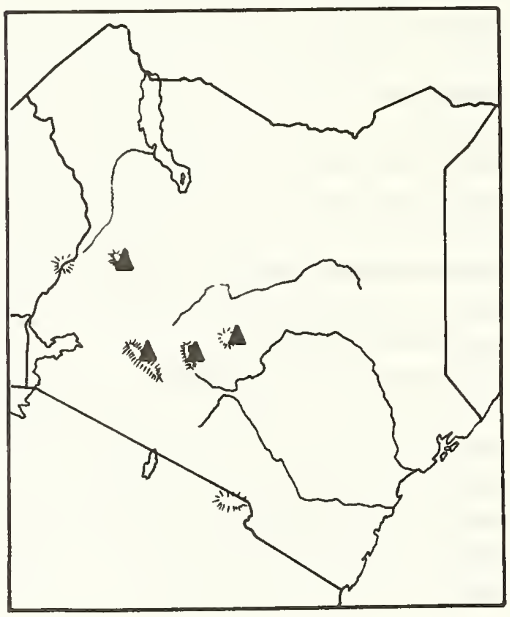

Figure 1: Map showing the distribution of Bongos in Kenya: Aberdares, Mount Kenya, Mau and Cheranganis.

up again from seed), despite being an important part of the animals' diet. Furthermore, an extract of the stem of this plant was shown to be lethal when fed to mice. Thus, "Nature has succeeded in controlling Bongo populations by means of the setyot vine" (Simon, 1962: p. 249).

More recent surveys, however, indicate that this may not be the case. The setyot shrub is widespread in the forests of Mau and Kakamega, not just restricted to the

bamboo zone of Mau (Mutangah *et al.* 1992). Vegetation surveys during the second year of the setyot cycle in 1991 showed considerable browse damage to the leaves of this species (Mutangah *et al.* 1992) without any sign or reports of dead antelopes. Indeed it would be surprising if the plant was toxic during one or two years of its life-cycle and not during others. Finally, although the stem was shown to be lethally toxic to mice, it is difficult to extend any conclusions about the chemical's effect on Bongos which have hugely different body size and an entirely different ruminant fermentation digestive system.

A much more likely cause of the deaths is rinderpest. In the 1890s an epidemic devastated wildlife populations throughout Kenya, and according to Ndorobo reports it almost exterminated the Bongo (Simon, 1962). The record of Bongo and Giant Forest Hog carcasses in the Mau in July 1960 corresponds precisely with reports in the same year of deaths from rinderpest of other Tragelaphines and Suids, both north of Mau near the Cheranganis and Mt Elgon, and south of Mau in the Maasai Mara (Stewart, 1964). There are also Veterinary Department records of cattle with rinderpest in the same period, much nearer the Mau forests (P. Rossiter, pers. comm.).

The following year, on the eastern side of the Rift which was affected by the epidemic later than the western side, both Bongo (Stewart, 1964) and Giant Forest Hog (Prickett, 1965) were reported to have died from rinderpest on Mt Kenya. It seems most likely, therefore, that this disease had a devastating effect on the Bongo in Mau, ironically in the same year as their protection was being improved by the establishment of the Southwest Mau Nature Reserve (42,500 ha). It is not clear how well they recovered from this epidemic, but it is satisfying to note that the disease has not been reported in the area since 1960 (P. Rossiter, pers. comm.)

What is much more of a concern at present is the negative effect of hunting, and to a lesser extent trapping. Although sport hunters have noted how difficult it is to track Bongo through bamboo forest (*e.g.* Prickett, 1965), the Okiek Ndorobos go hunting with packs of small dogs, and kill their quarry with spears or bows and arrows. Bongo stand majestically at bay when surrounded by small dogs, giving ample time for hunters to catch up and make a kill. This offtake, even if low because other antelopes are more commonly encountered, appears to have eliminated Bongo from the bamboo forests of central Mau; local hunters report that they have

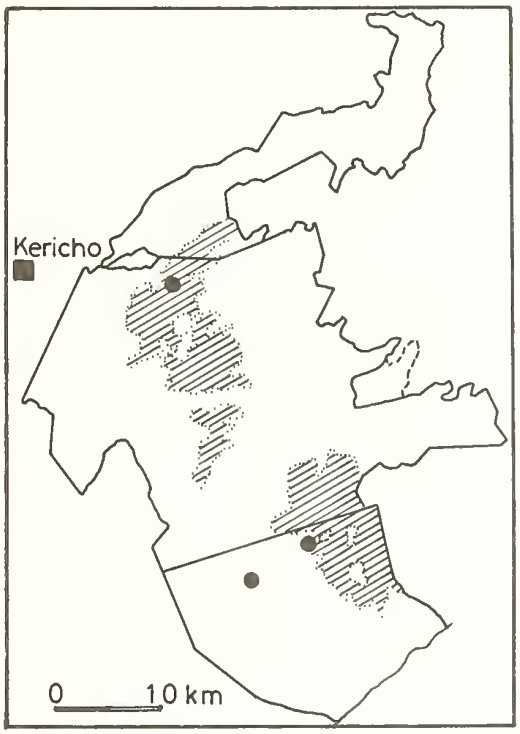

Figure 2: Map showing, from north to south, West Mau, South-west Mau and Transmara Forest Reserves. Shading shows extent of pure stands of bamboo and dots show post-1990 evidence of Bongos

"gone deeper into the forest" (Wily, 1992)! As a result, there is some urgency to improve protection of areas in Mau where Bongo, Yellow-backed Duikers and Giant Forest Hogs currently occur.

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Glyn Davies, P.O. Box 10, Limuru.

The author is Team Leader of the KIFCON/NMK Biodiversity Survey Team. The KIFCON Project (Kenya Indigenous Forest Conservation Project) is a joint initiative between the British Overseas Development Administration and the Ministry of Environment and Natural Resources, Government of Kenya.

QUESTION MARKS IN ELANGATA WUAS

Is there a race of black wild dogs? There is, according to the population of the Elangata Wuas Ecosystem Management Programme, in which the National Museums of Kenya cooperate with Kenya Wildlife Service and the local self-help group "Elangata Wuas Programme Committee". There is not, according to most wild dog researchers, who regard the issue as too ridiculous even to think about.

Still, the programme population is Maasai and Maasai tend to know their predators. And among the older generation of KWS rangers, there are quite a few who agree that, in the past, there were black wild dogs in the area concerned, as well as in the Nguruman Escarpment. They mention that the black wild dog also has more pointed ears than other wild dogs. So?

The issue came up when, at the beginning of the year, the population was asked if there were any wild dogs in the area. When people were told that there were hardly any wild dogs left in the Mara, none in Amboseli and only a limited number in Serengeti, they laughed their heads

off. The programme area (in Kajiado District, Central Division) had, according to them, at least eight packs. And there were two species... Since then, a Dutch volunteer has spent two months in the area to trace the dogs. She never saw them, mainly because the area is extremely bushy and rocky. But the dogs came to the camp to howl at her at night and she collected reports of sightings that indicate there maybe are at least between 60 and 80 dogs in the area. That is already extremely good news. At last, when she had become quite desperate about the fact that she never saw one of them, the volunteer decided to go bird-watching instead. Of course, she almost immediately stumbled over a few dogs, less than 300 m from her camp. One week after she left, a pack of fifteen dogs waited nicely along the roadside until the vehicle of the programme manager had passed. But they were not black... The programme is now working on the design of a community-based wild dogs conservation programme, that would give the community itself responsibility over the dogs, in line with the overall programme objective that people should manage their own ecosystem. One of the results of the work of the volunteer has been that people have come to understand that wild dogs are special.

And the black dogs? The riddle may not be solved before somebody has been able to trace them and, at least, take good photographs. Of course, some scientists might like to have one darted for research purposes. But that is precisely what the planned conservation programme may not encourage.

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The author is Coordinator of the Elangata Wuas Ecosystem Management Programme, conducted in cooperation with the NMK.

OBSERVATIONS ON THE NILE CROCODILE (*Crocodylus niloticus*) AND THEIR NESTS AT ALLIA BAY, SIBILOI NATIONAL PARK, LAKE TURKANA

Sibiloi National Park is located on the north-eastern shores of Lake Turkana. This park harbours a variety of wildlife, including a large number of Nile Crocodiles (*Crocodylus niloticus*).

During 9 and 10 September 1992, while camping at Allia Bay, observations on crocodiles and their nests were made on a peninsula near the park headquarters. The area was observed initially to locate the presence of crocodiles. 10x50 binoculars were used, and the observations were made from 17:00 to 18:30 h. A total of 19 crocodiles of various sizes were counted on the peninsula.

Location of crocodiles on the peninsula

A schematic map of the peninsula is given in Figure 1. For the purpose of my observations, the area was divided in three sub-areas, as indicated in the figure. The distribution of crocodiles in the general area was as follows:

- Area I had some of the largest crocodiles. This seemed to be a favorite basking place, as it was only occupied by larger animals. It also faced the setting sun.
- Area II contained medium-sized crocodiles that were all huddled at the tip.
- Area III contained only two crocodiles of approximately 200 cm.

Observation of nests

A large number of nests were observed on this peninsula, and there were both recent hatches and those belonging to the previous breeding season. To count these nests, the peninsula was demarcated into four transects (A, B, C and D: Figure 2). These transects were based on the profile of the beach. Results of the counts are given in table 1.

Table 1: Counts of nests along the transects

Transect	Past	Recent	Total
A	1	1	2
B	38	3	41
C	29	0	29
D	7	0	7
Total	75	4	79

Transect A

Part of transect A lies in an area that is prone to flooding during high water. In this transect 2 nests were located. One nest was a recent hatch as the blood stains were still visible in the egg shells. Approximately 15 egg shells were counted. The recently hatched nest had a trail that was visible, and extended to the shoreline. This was the location where the two crocodiles had been observed. The beach had a gentle profile and was covered with spiky grass.

Transect B

The beach in this transect has a steep profile; it faces into the westerly prevailing winds and this results in the washing up of aquatic weeds on the beach. The nests in this transect were located on the crest of the beach, above the high water mark.

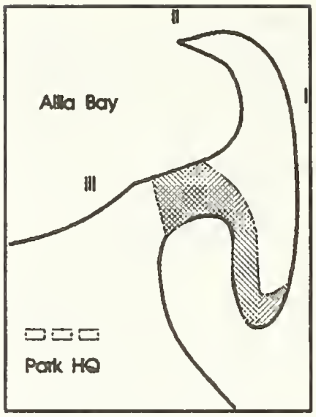

Figure 1: Map of the area of observation. I, II, III: areas as discussed in the text. Stippled area: area prone to flooding

A total of 41 nests were counted out of which three were recent hatches. There was freshly scooped soil and tracks of the female were visible from the shoreline to the nest. The nests were roughly the same dimension as those in transect A. There was one nest in which there was an addled egg; the nest was at least 36 cm deep.

Transect C

Transect C faced the open lake in a westerly direction. 29 nests were counted and there were various smaller depressions that could be test-digs by females. The nests all belonged to the previous season and no fresh nests were seen. The nests in this area were of a larger size than elsewhere. One old nest was about one meter across.

Transect D

This area contained old nest sites and seven nests were counted. This area is prone to flooding during high water and it did not seem like a suitable nesting site.

Discussion

On Central Island, the main breeding season of crocodiles is from October to April.

Nesting normally peaks towards the end of December and hatching peaks at the end of March (Modha, 1967). A park employee confirmed that the main hatching occurs during March at Allia Bay.

Four nests that were recent hatches probably hatched a few days before 9 October 1993. The eggs were probably laid during the beginning of June. The small nest size would indicate that the eggs were laid by a smaller sized female, as compared to the larger nests in transect C (Cott, 1961).

This out-of-season breeding seems to be confined to smaller females, as seen by the size of nests. The two crocodiles of approximately 200 cm long were seen in the vicinity of the recently hatched nests. There would also be a bias in nest counting, as unhatched nests are difficult to locate.

These recent hatches prompted me to search for the presence of juveniles. On central Island, half submerged *S. persica* provides an important habitat for juvenile crocodiles. At this stage they are vulnerable to predators (Modha, 1966). At Allia Bay the only suitable cover for the juveniles would be the extensive aquatic weed beds. During the day, extensive searching did not reveal anything. At 22:20 h, while observing adults using a torch, two juveniles were observed less than 9 m from the shoreline. They were appr. 40 cm long and they were in the densest part of the weed beds.

During the day a fisherman speared a large Nile Perch (*Lates niloticus*) within the weed beds. This large predatory fish would also pose a threat to hatchlings. Falling lake levels have resulted in a loss of prime crocodile habitat (Hutton, 1988). Placing brush piles or logs during the main hatching season can provide a better chance for the survival of hatchlings.

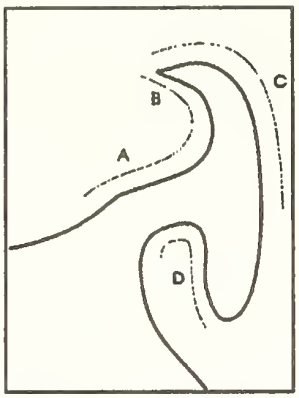

Figure 2: Location of the transects

There were many vehicle tracks all over the peninsula. This sort of careless driving should be discouraged by the park authorities, as it can result in the loss of nests when vehicles drive over them.

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P.S. Soorae, P.O. Box 44919, Nairobi

OLOLOKWI FIELD EXPEDITION: AN INVITATION

Ololokwi or Ol Donyo Sabachi is a 2100 m mountain north of Archer's Post, rising some 1000 m from the surrounding plain. It is topographically isolated from the rest of the Mathews Range to its north. Up until 1982 it had rhino and buffalo. The rhino

were removed to a sanctuary, and the buffalo died during the drought.

The area is also heavily used by cattle during the dry season. The available water is often drunk to completion leaving no water for wildlife. The loss of the buffalo in 1982 was a result both of drought and over-utilisation of grazing and water by cattle.

The area is still rich in birds of prey. A large Rüppell's - Griffon colony dominates the southern cliff wall. Peregrine, Barbary, Lanner, Taita Falcon and Rock Kestrel have been recorded on the cliffs. Crowned Eagle, Martial Eagle, Tawny Eagle, Steppe Eagle, Verreaux's Eagle, African Hawk Eagle, Ayres Hawk Eagle, Bateleur Eagle, Black Breasted Snake Eagle, Harrier Hawk, Egyptian Vulture, Lammergeier, Augur Buzzard, Steppe Buzzard, Mountain Buzzard, Grasshopper Buzzard, Pale Chanting Goshawk, Gabar Goshawk, Ovampo Sparrowhawk, Black Sparrohawk, African Goshawk, Levant Sparrowhawk, Cuckoo Hawk, Bat Hawk and others have been recorded from the cedar forest on top. The Crowned Eagle, previously conspicuous, has not been seen since 1982, and there is cause to believe that this species has gone.

A number of visitors climb Mt Ololokwi. Some leave a considerable amount of rubbish on the route, and at camp sites. The main cliff has also been mortared and shelled as have a number of other cliff nest sites for raptors within the area. So, far from being a pristine lost world, Ololokwi is badly used and has already lost animal species. Without interference the process of degradation will continue. The proposed tarmacking of the road from Isiolo to Marsabit which bisects the cliff sites will certainly open up the area to 'development'. The mountain itself is fortunately protected by its steep sides and never likely to be developed for forestry. It could be protected and wildlife encouraged to return if it can contribute to the welfare of the local people.

With this in mind the first priority is to assess and quantify the fauna and flora of the area. I am proposing that an expedition be made to Ololokwi by specialists in various fields such as ornithology, zoology, botany, entomology and geology. At this point I am suggesting a self-financed trip lasting only four or five days. This is sufficient to ascertain the potential of the area and enough to produce a paper for each topic.

If anyone is interested please write to me.

Simon Thomsett, P.O. Box 42818, Nairobi.

Announcement

LESLIE BROWN MEMORIAL GRANT 1993

In memory of one of the most inspired and productive raptor biologists of recent decades, the Raptor Research Foundation announces the availability of this grant, for up to $1,000, to provide financial assistance to promote the research and/or the dissemination of information on birds of prey.

Applicants must send a resume, specific study objectives, an account of how funds will be spent, and a statement indicating how the proposed work would relate to other work by the applicant and to other

sources of funds. Proposals concerning African raptors will receive highest priority among proposals of otherwise equal merit.

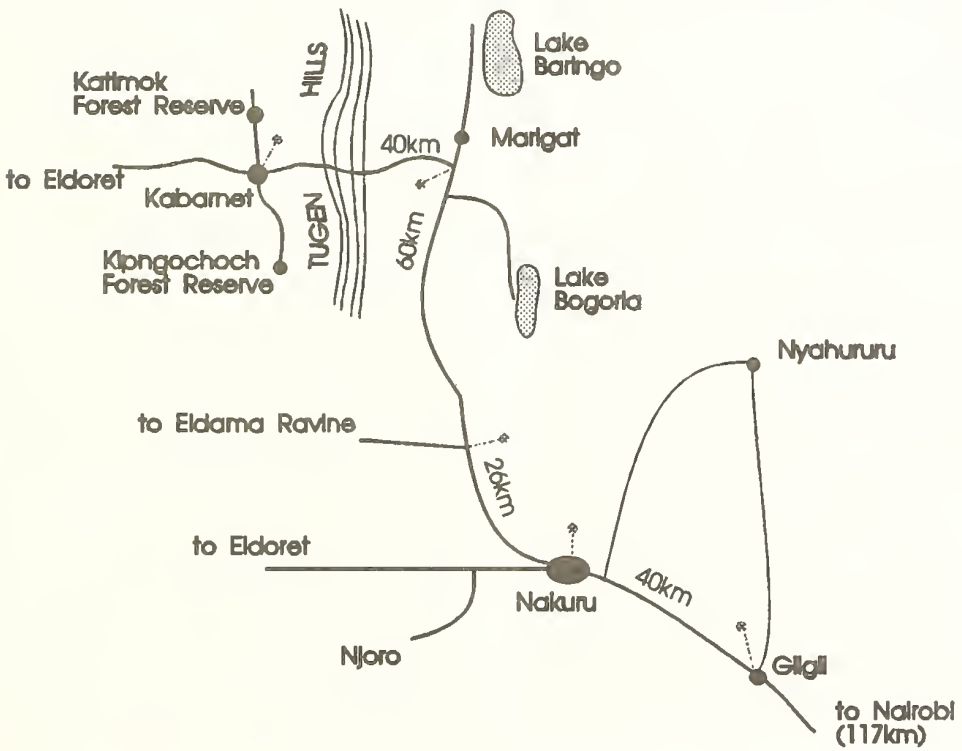
A complete application must be received by 15 September. Proposals, donations, and inquiries about tax-exempt contributions to the fund should be sent to:

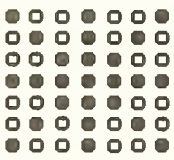
Dr. Jeff Lincer, Chairman
RRF Leslie Brown Memorial Fund
c/o BioSystems Analysis, Inc.
13220 Evening Creek Drive South
Suite 119
San Diego, CA 92128
USA

Field trip report

EANHS CAMPING TRIP TO THE TUGEN HILLS, 26 TO 28 FEBRUARY 1993

Unfortunately the Yellow Fever scare and the shortness of the weekend meant that only a few of us made the easy but spectacular journey (four hours) to the Kabarnet Hotel where William Kimosop met us. His disappointment at the small turnout was soon lost in his enthusiasm to show us as much as possible in such a short time. He took us to Katimok Forest Reserve, 15 km from Kabarnet on tarmac, where we camped at the Forest Station, overlooking the thick indigenous forest. There is a long-drop, a camp fire site and an ancient Rest House, now Francis the Forest Guard's office, with his house just below. There is space for three or four tents, it's private and secure and lovely walks through the surrounding forest abound. We heard Ross'





The British Council

Journals on Natural History

Almost everyone interested in natural history has at some stage wanted to get hold of a copy of a specific journal article on their particular interest—whether it is the hunting behaviour of wild dogs or the propagation of the Madagascan periwinkle. It can be very frustrating to come across a reference to the ideal article, and yet be unable to obtain it.

The British Library international photocopy service, available through the British Council, exists to meet this need. The library (in UK) buys a copy of virtually every serious journal published anywhere in the world, and will photocopy any article on request, and post it to Kenya.

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Turaco and Red-fronted Parrot but we could not spot them.

Next day we moved on to 15 km on the other side of Kabarnet to Kipngochoch Forest Reserve, also on tarmac. We camped at a most beautiful site under the trees on a ridge with wonderful views of both Lake Baringo and Bogoria. The site is fenced, totally private and secure, just above Symon the Forest Guard's house. There are no facilities at present. At this site we had the pleasure of the Brown Woodland Warbler serenading us virtually non-stop! There is a pine plantation next to the site on one side but indigenous forest all around, including a pleasant walk through it along the ridge to a view point of both the Kerio Valley and Bogoria.

William is the Senior County Warden in charge of all the reserves in Baringo District, extremely keen, knowledgeable and very anxious to help in any way. He took us on brief visits to several of the Forest Reserves including a particularly interesting one on the Kerio Valley side of a ridge where we saw Colobus and Syke's Monkey, several raptors including a Crowned Eagle with maybe a nest in a fig tree, and some temporary rock pools Carnivore style where Fleur Ng'weno would have been in her element!

A list of the birds we saw/heard is available from the EANHS office. We had little time for 'serious' bird-watching but it's all there waiting for you with the added bonus of a cool climate, 2700 m up, and lots

of forest making crack-of-dawn birding unnecessary—they do not get up too early themselves!

We would recommend camping at Kipngochoch the entire length of your stay, taking a walk and picnic to Katimok Forest Reserve one day, and maybe another day to the Kerio Valley Reserve once it becomes open (lots of undisturbed elephants). It is an absolute must for anyone wanting peace and quiet, something a little different, with the chance of seeing unusual birds and plants. It would also be possible to stay at Kabarnet Hotel, visiting the reserves from there. It is quiet, has a pool and is set in pleasant gardens on the edge of the town. All these places were well marked, on tarmac and easy to find.

For permission to stay at any of the reserves, and for him to contact the forest guards concerned, write to William Kimosop who is based at Lake Bogoria Reserve, P.O. Box 64, Marigat. Messages will also get to him c/o Lake Bogoria Hotel, phone (037) 42696 evenings, fax (037) 40896.

Janet and Keith Wood, P.O. Box 24615, Nairobi; Yvonne Malcolm-Coe, P.O. Box 48504, Nairobi; Ann Woollen, P.O. Box 221, Nanyuki.

Requests for information

Rüppell's Vulture

Dr. Peter Mundy, Government Ornithologist in Zimbabwe, is seeking information on Rüppell's Vulture breeding sites in Kenya for a possible future survey. Would any person wishing to assist with details of site position please write to Dr. Mundy c/o Pat J. Frere.

Communicated by Pat Frere, P.O. Box 15126, Nairobi

The Lammergeier: a plea for contemporary information

The Lammergeier (*Gypaetus barbatus meridionalis*) is sparsely distributed throughout Kenya and possibly restricted to high mountainous regions for breeding. Lewis and Pomeroy (1989) and Brown (1977) agree on its distribution in Kenya and Brown gives an estimate of twenty to thirty pairs.

Having visited some of the regions claimed to hold breeding Lammergeiers I suspect that this estimate is (now) over-optimistic. Conditions may have changed in the last decade so as to make some breeding locations or areas inhospitable.

Hell's Gate National Park used to have an easily-seen pair nesting on the main cliff face. From 1972 they were disturbed by rock climbers and, although they bred again in 1975, it seems possible that this was their last breeding year (Brown 1977). Since 1983 the Lammergeier pair vanished with only one dubious sight record up to 1992. It is widely accepted that repeated rock climbing and various motion-picture activities, such as dynamiting the cliff, parasailing within metres of the nest, and close flypasts in helicopters and fixed-wing aircraft disturbed the Lammergeiers and caused them to desert the area.

Hell's Gate National Park wants to have the Lammergeiers returned. Three forms of management have been proposed. First, no more rock climbing on the entire wall. Second, enlarging the relatively small nest ledge. Third, introducing young

Lammergeiers and 'hacking' them back.

The first two options may succeed in luring these birds back, if the old birds have remained in the immediate area. The introduction of young birds requires more planning and finance. The first thing we need to know whether there have been any recent sight records of Lammergeiers in the Hell's Gate region, Mt Longonot, Suswa, Njorowa Gorge, and the Mau.

In presenting a feasibility report for the proposed reintroduction of Lammergeiers I have first to assert whether or not this pair moved to another location. In order to save a lot of footwork and time I would like to ask the members of the EANHS if they could answer the following:

1. Have you seen any breeding Lammergeiers in the Hell's Gate region since 1983?
2. Do you have any opinion on the reasons why the Lammergeiers left their breeding site at Hell's Gate?
3. Do you have any objection to the re-introduction of the Lammergeier to Hell's Gate?
4. Do you know of any breeding Lammergeiers in Kenya?

If I can get a number of replies I can use these to gauge public response and to help determine the need to re-introduce the Lammergeier to Hell's Gate.

References

Brown, L. H. 1977. The status, population structure, and breeding dates of the African Lammergeier. *Raptor Research* 11(3), 49-80.

Lewis, A. and D. Pomeroy, 1989. *A Bird Atlas of Kenya.* A.A. Balkema. Rotterdam.

Simon Thomsett, P.O. Box 42818, Nairobi.

Book reviews

Flora of Tropical East Africa: "Boraginaceae" by B. Verdcourt

Though the quantity of FTEA parts published in 1991 is not as high as in recent years, the quality is as high as usual; and the two parts reviewed here are very important for East African botany.

Boraginaceae are a family of trees, shrubs and herbs; among the trees there are such well-known genera as *Ehretia* and its split-genus *Bourreria* (with two new species of *Ehretia* described, of which one is from northern Kenya) and *Cordia*, with 28 species. Among these are such important timbers as *C. africana* (formerly known as *C. abyssinica*, but probably better known as "muringa"); *Cordia sinensis* and *C. monoica* (with its sandpaper leaves). Two new species of *Cordia* are described, and apart from the widespread species, there are some narrow endemics, mostly from Tanzania, but also two from Kenya (Kiunga, and Dadaab area). There is also the strand tree *Argutea* and the climber *Tournefortia*, but the rest of the family consists of herbs, with such well-known genera as *Heliotropium* (20 species), *Myosotis* (the 'forget-me-not', three species from high altitudes) and *Cynoglossum* (or 'hounds-tongue', with nine species; four of these are new, all from mountainous areas of Tanzania, Uganda and Kenya). The keys to this volume are clear and practical, and the drawings are impeccable and stylish. They are the work of the well-known Mrs Maureen Church, who is retiring this year. East African botany owes a great deal to her wonderful

illustrations, ranging from Dale and Greenways' "Kenya Trees and Shrubs" (and its imminent successor), to Verdcourt and Trump's "Common Poisonous Plants of East Africa", and to many volumes of FTEA.

Flora of Tropical East Africa: "Burseraceae" by J. Gillett

The drawings in this volume are very disappointing, and in shrill contrast to the professionalism of Mrs Church. I choked over wobbly petiole lines, haphazard branch shadings, unlikely leaf margins, and, worst of all, leaf veins that are exceedingly amateurish and in some cases definitely wrong. I find it amazing that such bad quality illustrations are used in a part of the Flora that is of enormous importance.

Commiphora is the dry-zone genus par excellence, with six species in Uganda, 35 in Tanzania and 51 in Kenya. *Commiphora* produces myrrh and other such resins, and recent research indicates a use as tick-repellent as well. The author, Jan Gillett, is a well-known figure in East African botany (he was, for instance, employed on the Kenya-Ethiopia boundary commission of 1952). He worked in the East African Herbarium for many years, and wrote up such large groups as *Sesbania* an *Indigofera*. *Commiphora* is the group he has worked on recently, and users of the East African Herbarium will instantly recognize the tables in the back of the book, with very Gillett-esque altitude/rainfall/distribution data for all species and subspecies—a very useful tool when the keys are too difficult. And they are difficult, but that is caused by the genus itself rather than by its author. This is a group which requires one to 'get into' its species; it takes time and patience, but if you work in the drier parts of East Africa it is worth it. The keys are technical and daunting, but if one is interested, and perseveres, they do work. There are 66 species in all, with six species newly described; twelve are small-area endemics, but many have a wide distribution, such as *C. habessinica*, *C. campestris*, and *C. africana*. Two smaller genera make up the family: *Canarium* with two species, large trees of wetter areas; and *Boswellia* with four species, of dry areas.

Henk Beentje, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, England

Society News

EDITOR'S NOTE

The Bulletin has, in the past, often contained lists of species sighted on a particular occasion, or from a specific area. Since these lists are the basic information on which studies of biodiversity—a topic so much in vogue these days, and rightly so—it was and is still felt that these list should be put on record in an appropriate place.

Unfortunately, we cannot spare the space within the limited pages that we were alloted to continue publishing these lists as an integral part of the Bulletin. The printing costs in Kenya have, like all other costs, soared, and since it is the policy of the EANHS to keep membership fees as low as possible, it is not feasible to expand on the number of current pages. Another argu-

ment for not publishing the lists in the main Bulletin is that each of these lists often is only of interest to a limited public.

To keep costs while still providing a means for publishing these species lists, we now intend to publish the lists as separate booklets, possibly several lists on related subjects together. These supplements to the Bulletin will be available from the EANHS office at cost. We fear that the only alternative to this procedure is to increase the membership fee, which seems to us the worse of the two evils.

We would like to invite our authors to keep this new policy in mind when submitting material for the Bulletin. Probably the best thing to do is to mention the highlights of the species lists (like new species for an area, or species that have not been observed for a long time) in the main article, and mention that a complete list is available. The full list should be submitted with the article for later publication.

Please don't interpret this policy as discouraging publication of species lists. We welcome them more now than ever. By putting sound information on species distribution on record, Society members can make a significant contribution to biodiversity conservation in East Africa. They have done so already for birds, where nest records of the Society have greatly contributed to Lewis and Pomeroy's book "A bird atlas of Kenya".

We hope that this new policy will help us to remain a financially healthy Society, and still get a maximum of information to our members.

FRIENDS OF NAIROBI ARBORETUM - FONA

A PROJECT OF THE EANHS

Friends of the Nairobi Arboretum (FONA) is an initiative launched by members of the Society to stimulate interest in the Arboretum. The objectives of the project have appeared in the Bulletin issue of December 1992.

On Saturday 5 June 1993 FONA will celebrate world Environment Day, at the Nairobi Arboretum. Events will take place throughout the day, beginning with an early morning bird walk with Fleur Ng'weno. Details on other activities will be available nearer the day from the EANHS office. A programme will be announced in a later Newsletter.

The day will end with the video by Sir David Attenborough "Mpingo, the tree that makes music", by the Television Trust for the Environment TVE, partly sponsored by UNEP. Projection starts at 7pm in Louis Leakey Auditorium of the National Museum.

Please come, with family and friends and support this Society project.

Ann Birnie, Chairman FONA, P.O. Box 30158, Nairobi

MEMBERSHIP:
This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society - National Museum Library (postal borrowing is possible) and copy of the EANHS Bulletin every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

JOURNAL:
The Society publishes, in collaboration with the National Museums of Kenya, the Journal of East Africa Natural History. The Journal is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Secretary, P.O. Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

EANHS BULLETIN:
This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), P.O. Box 44486, Nairobi, Kenya. Line drawings can be published. Photographs will be considered if they are essential to the article.

SCOPUS:
The Ornithological Sub-Committee publishes this journal five times a year, cost KSh. 150 per annum. All correspondence to D.A. Turner, P.O. Box 48019, Nairobi, Kenya.

EANHS MEMBERSHIP RATES PER ANNUM

	Local KSh.	US$	Overseas £ Sterling
Life	5000	200	130
Corporate	5000	200	130
Sponsor	500	50	35
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Full	200	15	10
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Student*	30	10	7

* Full-time students (including university undergraduates) or children under 18.

Subscritions are due on 1 January. From 1 July you may join for half the yearly subscription and receive publications from that date. Application forms for membership are obtainable from the Secretary, P.O. Box 44486, Nairobi, Kenya.

THE EAST AFRICAN NATURAL HISTORY SOCIETY

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East Africa
Natural History Society

BULLETIN

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E. Vanden Berghe

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In Memoriam

Kenneth Young

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EANHS Chairman's Report for 1992/93 - Leon Bennun

Ladies and Gentlemen,

Allow me to welcome you to the Society's 83rd Annual General Meeting, and to report on our activities over the last twelve months. I notice that my report last year took up a little over two and a half closely-spaced pages in the Bulletin, so I will attempt to be briefer this time; if I fail to mention anyone's contribution as a result, I hope that he or she will forgive me.

First of all let me thank our Vice-Chairman, Dr Richard Bagine, and the entire Executive Committee for their hard work and support over the year. The office continued to run smoothly thanks to the dedicated efforts of our Hon. Secretary, Lorna Depew, and a number of volunteer assistants, in particular Inga Ayres, Lise Campbell, Rhona Irving, Joseph Oyugi and Judith Rudnai. Lorna and her helpers are really the unsung heroes of the Society, putting in a vast amount of work to little acclaim. Additional assistance is always needed in the office, and I reiterate our frequent plea for members with a little time to spare to come forward and help.

Last November the Executive Committee decided to appoint a part-time Office Manager to assist the Hon. Secretary with her duties. This post has ably been filled by Joseph Oyugi and I thank him on the Society's behalf for his dedicated efforts. The office is now open daily, and these extended opening hours have boosted our sales and, I hope, made it easier for members to look in.

Our monthly talks and lectures continued under the capable supervision of Judith Rudnai. We have seen a varied and interesting programme over the last year. Highlights have included Dave Richards displaying a selection of superb photographs in his lecture on Birds of Kenya, Drs Holekamp and Smale speaking on their fascinating study of Spotted Hyenas in the Maasai Mara, and Dr Mark Stanley-Price on the reintroduction of the Arabian Oryx.

Field trips have been made to, among other places, Mt Kenya, Longonot, Ngong Hills, and Tugen Hills. The last of these, postponed once, proved to be a very worthwhile trip for the few members who were finally able to go, and I hope that we may be able to arrange another excursion there in due course. Wednesday morning birdwalks continued, as did the Sunday pot-luck outings. Thanks to Maryanne Kamau for organising field trips, Fleur Ng'weno and Damaris Rotich for leading the birdwalks (as for many years) and Janet Wood and Chris Hill for organising the pot-luck outings.

Turning to our publications, last year saw the departure from Kenya of our Hon. Editor for the Journal, Charles Dewhurst. Since taking over as Hon. Editor Charles has worked extremely hard to maintain and improve the standard of our Journal; I would like to express thanks on behalf of the Society for the excellent job that he has done. He will be sorely missed and we hope that his absence will be a temporary one.

Dr Edward Vanden Berghe has stepped in as Acting Hon. Editor in Charles' place, adding to his already burdensome duties as Editor of the Bulletin. I might add that he has personally been undertaking all the typesetting for both publications, as a donation to the Society, allowing us to save substantially on our publication costs. He deserves many thanks from us for his sterling work.

Changes to the format of the Bulletin to make it more attractive and readable are in the pipeline, which is one reason that the first issue of 1993 is slightly late. I hope that members will find these improvements to their liking. As I mentioned last year, changes in the way the Journal is published are also underway. Largely because of the changeover of Editors, and

some delays in discussions with the National Museums of Kenya, the new-look *Journal of East African Natural History* has not yet appeared. A Memorandum of Understanding with the National Museums has now been drawn up, however, and there is every expectation that the first issue will be out in the very near future.

Our specialised sub-committees continue to flourish. The Ornithological Sub-committee has devoted much time over the last year to a revision of the East African bird list, necessitated by the many discoveries and taxonomic changes that have been made since the Society published *Birds of East Africa* in 1980. This laborious task should see the production of a definitive new list within the next year or so. *Scopus* has continued to appear under the supervision of the OS-c chairman, Graeme Backhurst, and ringing of Palearctic birds at Ngulia continued for the 24th successive season. The Ngulia programme increasingly attracts international support and interest; during the last season it was good to note that outside funding enabled a contingent of younger Kenyan ringers to take part and gain experience.

ICBP-Kenya changed its name in March 1993 to BirdLife Kenya, following a corresponding change by the International Council for Bird Preservation, now called BirdLife International. As well as tracking conservation issues, the section has been active in fundraising; the Second National Bird Art Exhibition was held in June 1992 at the Sarit Centre and proved an enjoyable and well-attended show. Continuing the theme of bird art, BirdLife Kenya sponsored a one-man show of bird sculpture by Kioko Mwitiki in March 1993, with many memorable and engaging pieces on display. The section also sponsored the building of a Crowned Eagle hide in Ololua Forest, which looks down on a nest of these magnificent birds; the hide was officially opened in March 1993 and is already in use as an educational facility. Finally, BirdLife successfully launched a new magazine, *Kenya Birds*, as a joint venture with the National Museums' Ornithology Department. Initial responses from readers have been favourable, and it appears that the publication fills a niche which the Bulletin, with its wider scope, cannot occupy.

The Kenya Wetlands Working Group has continued to track wetland issues. Many society members again took part in the July and January waterfowl counts at a number of Rift Valley wetlands. These provide both an enjoyable weekend out and a chance to contribute to an important monitoring programme. KWWG has also embarked on a pilot project to establish a computerised wetlands inventory for Kenya, with funding from the Netherlands Government. Once again, this project should in due course involve many Society members in providing information on particular wetlands.

Most recently, the Society has begun a new project, Friends of the Nairobi Arboretum, under the energetic leadership of Anne Birnie. In brief, the project aims to restore the Arboretum to its former glory and make it an educational and recreational centre for Nairobi. The project has only recently got under way, but I am sure that we will be hearing much more about it in the coming months; there is much in the Arboretum to interest any Society member and I would urge you all to give the project your active support.

The last year has been one of general economic difficulties, but despite this the Society emerges in better financial shape than anticipated. This is partly due to the cost-control measures decided on last March by the Executive Committee, and implemented during the year, but also to the tremendous response by members to my plea for donations. I would like to offer sincere thanks to all those who have made direct contributions or become Sponsors to the Society. I should also mention here the generous support for the Journal from the Eden Wildlife Trust, and bequests from the estates of Daphne Backhurst (for the Migration Fund) and Phillipe Rene Asplet. On the Executive, we need to thank Rupert Watson for managing these bequests, and Glyn Davies for his tireless fund-raising efforts.

Another major factor in bringing about our relatively healthy financial situation is the

work of our Hon. Treasurer, Brooks Childress. Brooks has brought his considerable experience and uncluttered thinking to bear on the Society's books, with remarkable results. He has put in a tremendous amount of time and effort in the Society's cause.

Having said all this, the present inflationary trends potentially put the Society in a difficult position, and our Hon. Treasurer will have more to tell you about this in due course.

In conclusion, I would like to say a few words about the wider role of the society. Worldwide, there is increasing concern for the conservation of biological diversity. One of the major problems in making effective conservation plans is that we simply do not know what biodiversity we have: and this is as true for East Africa as for anywhere else in the tropics. This is where a society of amateur natural historians can play an enormously important part. What we already know about the biodiversity of eastern Africa is derived, to a very large extent, from the steady activity of the Society's members over the last eighty-four years; it is fair to say that "biodiversity" is really a fashionable new word for good old "natural history". The Journal has for long been a major source of biodiversity information for the region, and we hope that in its new format it will soon establish itself as East Africa's primary publication in this sphere. We have among our membership tremendous expertise. As projects to map, survey and computerise biodiversity begin in various institutions, the Society needs to make this expertise available, assert its relevance, and seek financial support for its activities. This represents both a major challenge and an opportunity for us over the coming years.

1992 Financial report - Brooks Childress

I am pleased to report that, with the generous support of the members, the excellent work by Dr Vanden Berghe in reducing the publication costs of the Bulletin and the fact that we published only one Journal part, instead of the usual four, our Society ended the year with a modest financial surplus.

As you may recall, in the last year's report, we expressed a great deal of concern about the trends of both our receipts, which seemed to be heading downward, and our costs, which seemed to be spiralling upward.

In order to put the Society on a sound financial footing, we reported a number of significant cost reduction measures which we planned to institute. These included limiting each issue of the Bulletin to 16 pages, continuing to do the typing and printing preparations ourselves, moving the printing of the Bulletin to AMREF publications department, and arranging to share the printing costs of the Journal with the National Museums of Kenya.

Dr Vanden Berghe who, as you all know, is serving as the editor of both the Bulletin and the Journal, has been very successful in accomplishing most of these measures which has enabled us to keep our publication costs under control even during this highly inflationary period.

Separately, although we did not recommend increasing the basic membership fee last year, we did recommend the institution of two new membership categories: the "Sponsor" category at KShs 500 and the "Corporate" category at KShs 5,000. We also recommended increasing the "Life" membership fee to KShs 5,000 and an all out effort by everyone to enroll new members.

Thanks to the support from our new Sponsors, everyone's effort in signing up new members and the fee increases approved by the 1991 AGM, our annual membership receipts increased by just under 50%, compared with the previous year.

Furthermore, the generosity of several large donors, including the estates of Daphne Backhurst and Phillipe Asplet, along with Muchekehu & Co and the Eden Wildlife Trust,

enabled the Society not only to partially offset increases in its annual audit and Journal production costs and the major expected decline in life membership receipts, but also to restore the Migration Survey Fund, which was turned over to the Ornithological Subcommittee.

Overall, our receipts (excluding donations to our special funds) were up by 11%, while our expenditures were only up by 12%, resulting in an operational surplus for the year of KShs 18,600 compared with a surplus of KShs 19,413 for the previous year. As indicated earlier, this small surplus is due largely to the fact that the publication of two Journal parts planned for 1992 was delayed until 1993, in anticipation of the new combined EANHS/NMK Journal.

Now, let's look forward to 1993-1994.

As you can imagine, with the unprecedented inflationary pressure on our publication costs, which appear to have increased by 100% since January, and will undoubtedly go higher during the next 12 months, the Executive Committee believes it has no choice but to recommend a modest increase in the basic subscription fees.

The following increases, to take effect immediately, were approved by the AGM:

- Local individual membership from 150 to 200 KShs
- Local family membership from 200 to 300 KShs
- Local institutional membership from 200 to 300 KShs

No changes were recommended in the fees for Sponsor, Corporate, Life or Overseas memberships.

Finally, the Executive Committee requested and was granted standby authority to raise subscription fees further by a maximum of 25% on 1 January 1994 if, in the opinion of the Committee, such increases are absolutely necessary.

Your Executive Committee believes that with these fee increases, continued support by our current members in terms of donations and sponsorships, and a continued effort by everyone to increase the number of members, we will be able to survive the next 12 months without having to dip into our modest deposit accounts.

Articles and Notes

THE COLLECTION AND ELUCIDATION OF VERNACULAR NAMES: OBSERVATIONS ON SHAMBAA ETHNOBOTANY

The following notes provide additional comment to the list of Shambaa tree and shrub names and their uses published by Jon Lovett (1992). The Shambaa (or Shambala, also called Sambaa by some of their neighbours) are a Bantu speaking people who live in the Usambara Mountains in North-east Tanzania. We are fortunate in already possessing more information on Shambaa ethnobotany than for many East African people: in addition to work by Fleuret (1979a; 1979b; 1980) on different aspects of Shambaa plant classification and use, there also exists a cyclostyled dictionary of plant names in Shambaa and two closely related languages, Bondei and Zigua/Nguu (Sangai, 1963). This dictionary gives well over 1,000 names (including cognates) in the three languages, together with their botanical equivalents. Despite its comparatively modest size, the list reproduced by Lovett is an important addition to the literature on Shambaa ethnobotany, and in the following notes I hope to indicate why this is so, as well as make further observations about the Shambaa list and East African ethnobotany in general.

The list comprises 53 names provided by Mr Mgaa Sabuni, a resident of Mgwashi village and forest guard at the University of Dar es Salaam's forest reserve at Mazumbai in the West Usambara Mountains. Lovett remarks that subsequent users of Sabuni's list (using different local guides) have commented that it is not wholly accurate and notes that there is obviously considerable local variation in the application of names to plants that are not commonly used. However, comparison of the Shambaa terms in Sabuni's list with Sangai's (1963) dictionary reveals a high degree of correspondence (and presumably accuracy). 46 (or 87%) of the 53 names in Sabuni's list can also be found in Sangai's dictionary: which does not mean, of course, that the remainder are wrong. There are, it might be added, some differences in the transcription of Shambaa, and where necessary I have taken account of these. Some of the terms in the Sabuni list are evidently mistranscribed, *e.g.* "dwaiu" for Sangai's *mdwayu*, "cherooti" for *msheruti*, "mbakambaka" for *mbwakambwaka*, and "mshiwhi" for *mshihwi*. It is also evident that a few of the terms given by Sabuni have been translated in part or whole from Shambaa into Swahili: thus "mpiga magasa" for the proper Shambaa *mtoa-maghasa* (literally "hand-clapper"). Sabuni's "mti wa paa" (Swahili "impala tree", identified as *Dovyalis abyssinica*), not present in Sangai, also seems to fall into this category; likewise his "mweti misitu" or "*mweeti* of the forest" (given as *Rananea melanophloeos*), where the unqualified Shambaa name *mweeti* (also *mweleti*) refers to *Rauvolfia caffra* according to Sangai.

At the same time, 38 (or 83%) of the 46 terms common to both lists are given substantially similar (or overlapping) botanical identifications, *i.e.* corresponding at the generic level. Again, this does not mean that the remainder are incorrect: this could only be established by further investigation. To the extent that they corroborate one another, however, this does increase our confidence in the accuracy of both lists. In one important respect, though, the Sabuni list is much less complete than the Sangai dictionary. Where only three (6%) of the names in the former list are given double identifications, more than half of their equivalents in Sangai (24 of the 46, or 52%) are given two or more botanical equivalents, and in 63% of cases (15 out of 24) these multiple identifications are not confined to a single genus. Thus *msheruti*, mentioned above, is identified as both *Philippia benguelensis* and *Pterolobium stellatum*. In this respect the Sabuni list is not inaccurate: it is simply incomplete, though this may help to explain why it has appeared inaccurate to other observers.

Lovett suggests that local variation in the application of vernacular names to less commonly used plants may explain the apparent inaccuracy of Sabuni's list. This is, however, only one of a number of possible explanations for the discrepancies in naming which occur. These different explanations can be grouped under four main headings, as follows:

1. Informant Error. There are different kinds of errors to be considered. One of these is a plain linguistic error, the misquoting of a name by an informant or its mistranscription by the recorder. The translation of vernacular terms into Swahili (often for the benefit of a particular listener, though sometimes as the unintended consequence of a more general process of linguistic change) is a special and fairly common case of this. The misidentification of plants and misapplication of terms also undoubtedly occurs. Although it is not difficult to find young informants from a rural background with a ready command of more than 100 vernacular plant names, knowledge of local vegetation and its uses clearly varies considerably between individuals according to a number of factors (including age and sex), with herbalists and similar specialists often having the widest knowledge. It is also evident that this knowledge will vary from one locality to another depending upon differences in the local

vegetation: informants in an unfamiliar environment will be much more prone to making errors than on their home ground. At the same time, and in the absence of any standard other than common agreement, there may also be borderline cases between erroneous identification (beginning with individual errors) and its possible consolidation into unorthodox opinion (which may develop into local orthodoxy). This process may occur when a number of people move from one area to another, and consistently make the same mistakes of identification for the same reasons (*e.g.* because of the similarity of an unfamiliar plant with one they know from their original home). In this way what begins as collective error can result in linguistic variation.

2. Linguistic Variation. Where the names for plants vary in a regular way from one location to another we can ascribe this to dialect differences. Dialects often form continua of mutual intelligibility and it is not always easy to draw hard and fast boundaries between them. Whereas most languages in East Africa have been classified and described, at least in outline, the description of the dialects which comprise them is not as well advanced. Shambaa (or Shambala: the presence or absence of /l/ varies according to dialect) is no exception. Besha (1989) notes that the Shambaa dialects have not been studied at all, and for the purposes of her own analysis of the language provisionally distinguishes between three main varieties, centring on Mlalo, Lushoto and Korogwe respectively. Given the existence of such differences it is important for researchers or their assistants to transcribe vernacular names as accurately as possible, and for the former to be aware of existing orthographic conventions (which may conceal linguistic variation, as widespread use of standard Kikuyu orthography does in central Kenya). It is perhaps even more important for them to note relevant details about the background of individual informants and their speech. At the very least informants should be identified by their residence or place of origin, as Lovett has done for Mgaa Sabuni. Unfortunately, Sangai's dictionary tells us nothing about his sources or the dialects concerned, though the range of cognates in some cases might lead us to suspect that terms from a number of different dialects are included. Thus Sabuni's "mula" (*Parinari excelsa*) is given the following Shambaa variants by Sangai: *muula*, *muwa*, *mbula* and *hula*. *Mula*, with a short or single vowel, is identified by Sangai as the Zigua version of the name, though it is difficult to judge how reliable either his or Sabuni's transcription is in this case. Another factor which can complicate this situation is bi- or multilingualism in different dialects and/or languages on the part of informants. This may also give rise to apparent discrepancies which are really normative aspects of linguistic variation. Again, only by carefully recording vernacular names and noting down the relevant contextual information is it possible to determine whether or not this is the case. The failure to take account of linguistic variation is extremely common in the collection of ethnobotanical data and affects even the best-known languages, including Swahili (see Walsh, 1992).

3. Multiple Designations. Everyday processes of linguistic change, incipient or otherwise, may also lead to a situation in which the same plant (or group of plants) has one or more alternative names in the same dialect. These often arise as nicknames used to describe particular features of the plant or its characteristic uses. The best example of this in our sample is the number of different Shambaa names for *Isoberlinia scheffleri* given by Sangai: *mamba*, *mbaika* (the "splitting tree"), *mfimbo* ("stick tree"), *mshembeshembe* (glossed as "grain by grain"), *msuke*, and *mtoa-maghasa* ("clapping hands"). The glosses given by Sangai make it apparent that some of these are nicknames, a number of them referring to the explosive noise made by the ripe pods of the tree when they burst. One of these names, *mbaika*, is

clearly cognate with the Swahili name *mbarika*, which is said to be applied not just to *I. scheffleri* (the Shoe-sole Tree), but to any tree which makes this noise, including, the Lucky Bean or Mahogany Bean Tree, *Afzelia quanzensis*, and the Castor Oil Plant, *Ricinus communis* (Greenway, 1940). The coining of nicknames is clearly one of the forms of linguistic innovation which can result in multiple designations. A word of warning though: the interpretation of such names usually requires a reasonable understanding of the language or dialect concerned. The standard dictionary of Digo ethnobotany, for example, is marred by the careless ascription of meanings (derived from a superficial comparison of Digo with Swahili) to many of the plant names (Glover *et al.*, 1969). Another, though less common, source of alternative designations occurs when the same species has clearly distinguishable forms: thus young and mature Doum Palms (*Hyphaene compressa*) are given different names in many Bantu languages. Other linguistic processes which may lead to the existence of multiple designations have already been referred to above: these include bi- or multilingualism and the adoption of names from other languages, whether as a result of direct borrowing or the social and linguistic assimilation of the speakers of these languages.

4. Taxonomic Under-differentiation. This is a frequently remarked feature of vernacular taxonomies, especially when the oral transmission of botanical knowledge is the rule. The same name may be applied to more than one plant for different reasons. The most common reason is because of the perceived morphological similarity—and in some cases failure to recognise the difference—between species which are distinguished botanically (though not always easily so). Thus the Shambaa *mkuyu*, identified solely as *Ficus sur* in Sabuni's list, is applied to at least three other members of the same genus according to Sangai (and likewise the cognate term in other East African Bantu languages). Similarly, *mkumba* describes at least three *Macaranga* species (*M. capensis*, *M. conglomerata* and *M. kilimandscharica* according to Sangai), while *mshai* is applied to three different species of *Albizia* (*A. adianthifolia*, *A. gummifera* and *A. schimperiana*). Plants grouped together because of their morphological similarity need not, of course, be members of the same genus or even family, according to the morphological criteria which are applied in any particular case. Morphologically dissimilar plants may also be described together under the same name because they share similar cultural uses and functions: a principle of classification which is very different from the Linnean. Examples of this principle being applied are difficult to discern in Sangai's dictionary because it does not give detailed information on plant uses, though Sabuni's list implies that *Dicranolepsis usambarica* and *Peddiea fischeri* are called by the same Shambaa name (*mkisigizi*) because their bark is used in making similar kinds of ropes. It is likely, however, that many more examples of the application of such functional criteria can be found in Shambaa ethnobotany, broadly similar to those described for the Mbeere of central Kenya by Riley and Brokensha (1988).

There are therefore a range of possible explanations for the discrepancies between different lists such as those provided by Sabuni and other informants. In order to be certain which explanation applies in a particular case, a lot more ethnobotanical data has to be collected and published. This is as true among the Shambaa, who appear at first sight to have been well served in this respect, as it is among other peoples in East Africa. A single list from a single informant, however well-informed, is clearly insufficient as a database, and only becomes valuable when it can be compared with and evaluated against other lists, collected from other informants in different places and with the relevant details added. The existence of a considerable body of information, such as

that provided by Sangai, should not discourage further research, but encourage the collection and publication of new data so that it can be checked and refined. As in the Shambaa case, this material can often be improved even further by more careful attention to the sociolinguistic context (which are the dialects involved? where and from whom were different names recorded?) and the elicitation of much more information on the local uses of plants, as well as the details of how they are recognised and why they are classified as they are. Readers should be encouraged, like Jon Lovett, to use the *EANHS Bulletin* to publish material of this kind.

Note

In the absence of adequate reference materials I have made no attempt to check or update the botanical names given by Sangai (1963).

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SIGHTING OF STRIPED WEASEL (*Poecilogale albinucha*) IN NGORONGORO CONSERVATION AREA

The Striped Weasel *Poecilogale albinucha* is one of the rarer mustelids in East and southern Africa. Previous mammal checklists for Ngorongoro Conservation Area (Swynnerton, 1958; Williams, 1968) do not include this species. The Striped Weasel is recorded by Hendricks (1971) as occurring in Serengeti National Park which borders Ngorongoro Conservation Area to the west. Kingdon (1977) reports that most records in East Africa are from open highland areas.

On October 13, 1991 I sighted the Striped Weasel at approximately 20:10 h along the Ngorongoro Crater Rim road (2400 m) one km to the east of the turnoff for Karatu during a nocturnal mammal survey. I observed the animal initially from 15 m with a hand-held high-intensity spotlight using 10x50 binoculars from the top of a vehicle. The animal after being spotted ran in front of the vehicle for approximately 50 m before bounding off the road into some high grass.

I have been conducting selected nocturnal surveys in Kilimanjaro, Arusha, Lake Manyara, Tarangire, Serengeti, and Ruaha National Parks and Ngorongoro Conservation Area since August 1989 as part of a study to document the current status of larger mammals in these Tanzanian protected areas. I have also distributed as part of this study a questionnaire to scientists and managers working in these protected areas requesting information about sightings of rare and uncommon mammals. Responses from scientists and managers working in Serengeti and Ngorongoro indicate there has been one sighting of the Striped Weasel in the last four years in Serengeti National Park. This sighting was made in 1988 approximately 15 km from Seronera in the vicinity of the Loliondo Kopjes.

Acknowledgments
I thank the Ngorongoro Conservation Area Authority and the Tanzania Commission for Science and Technology for permission to carry out this research and C. Sengoku for assistance in the field.

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Announcements

Volunteer position for archaeological survey

Two graduate students have become interested in a stone age pastoral culture which occupied Lukenya Hill (the very long hill just past the airport on the Mombasa road) about 2,000 years ago. The students hope to document the adaptation of this society and trace its geographic extent southward through the Athi-Kapiti Plains—an area for which there is no formal archaeological survey. First they need to visit Lukenya Hill to see the known sites. Then they need to look at some selected locations to the south to determine how easy it is to find similar sites in the proposed study area. The problem is that we have no vehicle. If you have a vehicle (4-wheel drive not required) and would like to make one or more day trips, please contact Charles Nelson, through the Department of History, University of Nairobi, or the Archaeology Division, National Museums of Kenya. Telephone 334244 ext 2165 (day); 718943 (evening).

Volunteer positions for puzzle fanatics

Would you like to be part of a project to solve an ancient "puzzle"? Physically, this puzzle consists of 12,000 shreds from 400 ancient vessels found at a most unusual early Neolithic site on the shores of Lake Turkana and dating to about 4,000 years ago. The problem is that, to conjoin the individual pieces, you must understand the design from which they come, but to understand the design you must first conjoin the pieces. Catch 22! And this is

why I need a couple of perceptive puzzle fanatics who would like to volunteer some of their time to tackle one superlatively interesting—both visually and intellectually—puzzle. Those interested should contact Dr Charles Nelson at the above address.

International Birdwatch '93:
9 and 10 October 1993

All around the world on the weekend on 9 and 10 October this year millions of people will be out watching birds. The object of this giant global birdwatch is to see as many of the world's 9,700 bird species as possible. In the process, the event will raise awareness of birds and badly-needed funds for bird conservation.

Here in Kenya the event is organised by Birdlife Kenya (a section of the EANHS). The plan is to have teams of three birders distributed around the country. Each team will "watch" a particular patch over hte weekend, and the birds they record will count towards a national total. Sponsors will be asked to donate a certain amount for each species on the final country-wide list.

Anyone who enjoys birding can take part—you dont have to be an expert. Also needed are volunteers to help us with the organisation and logistics. If you're interested but haven't heard from us, please contact Birdlife International, c/o Dept Ornithology, National Museums of Kenya, P.O. Box 40658 Nairobi; or telephone Jean Hartley (581157 Nairobi) or Leon Bennun (742131/61 Nairobi).

Flora '93

Every fifth spring, the National Botanical institute, Claremont, South Africa organises a flower show in three National Botanical Gardens in and around Cape Town: Kirstenbosch NBG, Harold Porter NBG and Karoo NBG. Flora '93 will be organised from 10 to 15 September. Rare, precious and beautiful examples of the flora of the South Western Cape on a soaring landscaped feature will provide the focal point for Flora '93. But the broad theme is the appreciation, conservation and sustainable use of southern Africa's indigenous flora.

More information about this event can be obtained from Anne Birnie, Box 30158, Nairobi; Tel 582010. Ann also tries to contact people interested in going there, to make joint travel arrangements.

Field trip report

A VISIT TO THE KAHUZI AND BIEGA NATIONAL PARK

Two mountains, the Kahuzi and the Biega, dominate the escarpment west to Lake Kivu. The National Park named after the two peaks encompasses some 800,000 acres of forest. The altitude range lies between 2,000 and 3,000 meters. The temperature variation, together with the differences of rainfall within the area and the mosaic of soil types, results in a very great diversity of species, plants as well as animals, particularly birds.

The park has many attractions to the naturalist, professional and amateur alike. The opportunities for botanists and entomologists abound, but even ornithologists and taxonomists interested in amphibians and reptiles could make surprising discoveries.

Presently the main attractions are the Gorillas. Indeed this park is the home of the largest surviving population of Eastern Gorillas. These Gorillas are usually advertised under the brand name "Eastern Lowland Gorilla" (*Gorilla gorilla graueri*) and, as the scientific name implies, presented as a distinct race. I am not sure whether this classification is justified: I am tempted to think that the so called Mountain Gorilla (*Gorilla*

gorilla beringei) and the Gorillas in the Kahuzi Biega are much the same kind. The barrier between the remaining "Mountain" Gorillas in the Virungas and the Impenetrable Forest and the "Lowland" Gorillas of the western escarpment of the Western Rift is entirely man made, and very recent, and I do not see how two races could have coexisted in an area which certainly is one ecological unit. Even the altitude does not convince me (I actually saw both of them on the same altitude) and that the "Mountain" Gorillas do not come lower anymore, well they are prevented from doing so by Man. Should divergence be incipient, than this will be the result of the separation now being imposed unto the populations. The argument about size, hairiness and the diameter of the nostrils does not impress me. I dare say these two groups of Gorillas have less genetic variation between them than the zoologists and the tour guides who argue for their separate identities: the tall, red-haired Celt and the hairy, little black Vallon whom I witnessed discussing these differences had far more glaring dissimilarities than the Gorillas I saw on the two opposite escarpments.

But whether they are "Lowland" or "Mountain", the Kahuzi gorillas are many and they are quite easily accessible. They also appear to be better guarded and looked after than the ones in the Virungas, largely because the latter live astride international boundaries; and although they live in three countries, they live in a region of exorbitant human population density...

There may be also differences in management. Generally the national parks of the Zaire are not as badly run as one would suppose might be the case in a country without an effective government, moreover in a country with a hundred-year history of exploitation. Perhaps these parks have become privatised in the sense that the senior officials have a great latitude of disposition. Whatever the explanation, the Kahuzi Biega Park seems to be well looked after. The officials seem to be enthusiastic about their park and the rangers, the guides and the trackers/slashers a disciplined and capable force. Those rangers whom I have met spoke French, English and Swahili in addition to the various vernacular languages they may speak and they were quite knowledgeable in various aspects of natural science pertaining to their park.

Now it may be a self-serving declaration when these officials say that there is virtually no poaching in their park and that there is no illegal tree felling either. I saw dozens of young men on their way from the market carrying various wooden household items, but I was told that the base of this trade is legal, licensed and sustainable. I wonder whether the explanation lays in the definition of these three words, but I must say that those large tracts of forest I had the opportunity to visit were free of any signs of intrusion in spite of the fact that a tarmacked trunk road bisects the same and that there is considerable transit traffic.

The Park is easily accessible from Bukavu and Bukavu has excellent facilities for the most sophisticated traveller. Lake Kivu is a spectacle in itself and the Ruzizi River through which the Lake—essentially a huge body of damned up water—empties into Lake Tanganyika, the setting for the arduous journey of the African Queen.

Tourism in this region of Zaire seems to be at capacity. There is no mass tourism. Looking at Zaire, opponents of mass tourism might find a further argument against that unappealing aspect of the trade: its extreme fickleness and its proneness to hysteria. No one should tell me that the reputation of the Zaire for order and tranquillity is particularly high; yet, instead of the customary U.S. State Department advisory against travel to the Zaire (in the risk-obsessed societies, travel to Africa must rank between cholesterol, nicotine, radon emanation and approaching asteroids), the "right kind" of traveller is there. This kind of traveller leaves more money and less rubbish behind and this is perhaps why the parks are better looked af-

ter...

Access to Bukavu is best via Bujumbura and with the help of an agency there. (I was quite pleased with the services of: Eden Travel, Mr. Edwin Hoskyns, P.O. Box 1075, Bujumbura, Burundi. Telephone number 257221622. Fax 257224723) although I organised the travel myself and braved the perils of the bureaucracy. This is a gambit requiring patience and liquidity starting in the Embassy of Zaire where the visa application form costs as much as the visa itself for other countries. Alas, upon protest the charming explanation is that the Zaire is many times larger than those other countries. The fact that the fee for obtaining a clearance for a private flight into Zaire airspace is, as such clearances go, the highest in the world is explained as retaliation for the humiliation Zaire suffers in the world...

But when one left the company of those mild mannered great apes and now sits facing the steep flank of Kahuzi the inimitable characteristics of this huge park reveal themselves at once. Its bird fauna is mixed western: home to the handsome Francolin, the Dusky Crimson-wing, the Stripe-breasted Tit and the Red-chested Sunbird, at the same time one sees many birds familiar to the East-African. One not only sees many strange trees but also groves which could be found, say, on the Aberdares. The Bushbuck and the Syke's Monkey are very dark. Clouds of butterflies of unimaginable numbers, variety and strangeness flicker about. Mixed flocks of Roughwings and Martins swoop in the clearings. The elephants are small, hairy and have weak tusks. And beyond the Kahuzi to the west lay largely unexplored, undescribed worlds.

Mr Imre Loefler, P.O. Box 47964, Nairobi

Book reviews

Flora of Tropical East Africa

Published on behalf of the East African Governments by A.A. Balkema, P.O. Box 1675, Rotterdam. Available from the East African Herbarium, National Museums of Kenya; the University Bookshop, Dar es Salaam; the Government Printer, Entebbe.

"Rubiaceae (Part 3)" by B. Verdcourt and D. Bridson

The third and last volume on Rubiaceae is out! Nineteen genera are treated, and apart from the normal key to the genera (in this tribe) there is a multi-access key as well. I am a bit unsure about this; it is very useful for restricted characters (a large, deep red corolla tube takes you straight to *Fadogia fuchsioides*) but with widely distributed characters (fruit small/large) there is an embarrassment of choices. However, it also gives you the possibility of using the characters you can see (which might be different from the ones in the main key), and with every step weed out the impossibilities. The tribe (*Vanguerieae*) is a complex one, with closely related genera such as *Canthium* (24 species), *Rytigynia* (51 species), *Vangueria*, *Pyrostria*, *Keetia*, and *Psydrax*. I have often dreaded identifications in this group, but in this book the keys are tight (no overlapping characters!) and practical. The family is one of the most important ones in East Africa, especially for the forest botanist; identifying the species will not be easy, but it will be a lot easier then before. Illustrations have been done by a large range of craftswomen (including Mrs Bridson herself) and are executed to a high standard.

"Meliaceae" by B.T. Styles and F. White

Meliaceae is a family of mostly pinnate-leaved trees and shrubs; the neem-tree is probably the best-known, but there are also such species as *Ekbergia capensis* (one of my favourite trees: Ol-subukiai in Maa), Mukou (*Melia volkensii*), large rainforest trees such as *Entandophragma* and *Khaya*, mangroves

such as *Xylocarpus* (Mkomafi). There are two larger genera: *Turraea* with 18 species, with very widespread species such as *T. nilotica*, *T. floribunda* and *T. holstii*, several recently described ones such as *T. kokwaroana* and *T. kimbozensis*; and *Trichilia* (six species) with Mururi, *T. emetica*. The keys are rather technical, with much reliance on fruits characters; I approve of the two keys for *Turraea*, one for flowering ones and one for fruiting ones. Illustrations are by Julia Loken, who produces beautiful as well as accurate work; top artists such as Mrs Church and Rosemary Wise; and J. Dyer, also with an elegant style. All plates are of the highest standards. This volume has been a long time in the making—but it is well worth the wait!

Henk Beentje, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, England

Requests for information

Books wanted

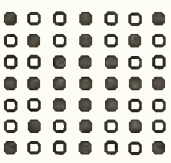
Prof D. Pomeroy is trying to get hold of the following books:

- Eggling and Dale: Indigenous Plants of Uganda
- Agnew: Kenya Upland Flora
- Blundell: Kenya Wild Flowers

Anyone who is willing to sell one of these can contact Prof Pomeroy via P.O. Box 10066, Kampala, Uganda

New magazine on Nature Photography

Foppe Brolsma is planning to establish a new magazine, devoted exclusively to nature pho-



The British Council

Journals on Natural History

Almost everyone interested in natural history has at some stage wanted to get hold of a copy of a specific journal article on their particular interest—whether it is the hunting behaviour of wild dogs or the propagation of the Madagascan periwinkle. It can be very frustrating to come across a reference to the ideal article, and yet be unable to obtain it.

The British Library international photocopy service, available through the British Council, exists to meet this need. The library (in UK) buys a copy of virtually every serious journal published anywhere in the world, and will photocopy any article on request, and post it to Kenya.

Payment is made for this service by means of purchasing coupons from the British Council offices here—each coupon entitles you to receive up to 10 pages of an article. The current price, which includes postage costs, is KSh. 250 per coupon.

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tography and focusing on wild plants and their habitats. For this purpose he intends to contact people all over the world involved in nature photography, either professionally or as a hobby, and who would be interested in an attempt to publish their work. He is also trying to locate existing collections of wildflower photographs.

Anyone interested in this plan and would like more information, or who has helpful suggestions, can write to: Foppe Brolsma, Hegdambroek 1726, 6546 VX Nijmegen, The Netherlands

Society News

Formation of EANHS
Succulent plants group

Despite the lengthy interval since the founding of the EA Natural History Society in 1910, and the Kenya Horticultural Society in 1925, it seems a curious omission that to the present day, relatively little importance seems to have been attached to succulent plants, those interesting and highly-specialised survivors of often arid and inhospitable habitats. Over 10,000 species exist.

With water becoming an ever-scarcer commodity, there has recently been an increased awareness of these plants, not only ornamentally, but also environmentally and medicinally. From the conservation point of view, there is also concern over the rapid encroachment of agriculture on natural habitats. Last September, for example, in the Ngobit area where land demarcated for settlement was being cleared, an endemic aloe species, *Aloe secundiflora*, had been uprooted by the thousands and piled in great heaps on boundaries, presumably in the hope that they would either die or go away—maybe this was seen as observing the letter of the Presidential decree regarding aloes?

What was happening at Ngobit is being repeated countrywide in areas of new settlement. Baobabs and *Euphorbia candelabras* have been amongst other recent succulent casualities. Whilst paying lip-service to the conservation concept, we don't seem to be applying the same degree of concern to our flora as to our fauna, although self-evidently the latter depends on the former!

Both preservation and conservation require working knowledge of the species to be conserved, and this is almost impossible to acquire when no forum exists to cater for people's interest, nor up-to-date references. G.W. Reynolds' "Aloes of Tropical Africa and Madagascar", published in a single edition in 1966 is, for example, seriously out of date, as is Peter Bally's "East African Stapelieae" of 1942.

We are, however, fortunate in having in our midst Len Newton, Professor of Botany at Kenyatta University, whose active work on indigenous succulent flora includes new species presently under description, and a number of keen and very knowledgeable amateur enthusiasts, so at least we have a nucleus of knowledge amongst us.

Canvassing mail-outs have revealed an unexpected depth of interest and enthusiasm for a succulents group, 145 people having responded in the first instance, and quite possibly there are others we have so far missed. At the time of going to press, an inaugural meeting is scheduled for Saturday 5 June, at which details of the structure, operation and aims of the group will be finalised, as will a name.

So far, eight people have expressed willingness to sit on an *ad hoc* committee, numerous offers of assistance have been received for everything from organising teas, to design and graphics, and with venues for field trips and meetings all over the country, whilst over Shs. 7,000/= have been sent in, unsolicited, to help with starting expenses. I have on file a letter whose writer didn't think there would be enough interest to warrant a

succulent plants group!

I envisaged the group, all members of EANHS, as subscribing additionally to our own publications, which must needs be educational. At the same time these must be of interest to all subscribers of (initially) wildly-differing levels of knowledge, from beginners to botanists. An "Exchange, Wanted and Offered" service and, ideally, a seed-scheme are needed, together with a good programme of activities.

Functions where space is unlimited can be open to all EANHS members, but where limited, priority may have to be given to the group's own subscribers. Hopefully field trips and outings will attract ornithologists, entomologists *etc.*, who can point out the broader inter-relations between plants, insect, reptile, bird and mammal life, and which would be of interest to all participants. High degrees of specialisation in study-fields can too easily overlook these complex inter-relationships, which seems a pity. We could all benefit by learning more about them.

Affiliation is being arranged with the Aloe, Cactus and Succulent Society of Zimbabwe (P.O. Box 8514, Causeway, Harare, Zimbabwe), who not only produce excellent technical bulletins and journals, but also at intervals host international congresses, attended by enthusiasts from all over the world. At the time of writing, I am awaiting a reply from their seed-scheme organiser, to my suggestion of mutual co-operation.

Further and more specific details of the succulent group will have to wait until after the inaugural meeting on 5 June—which is also World Environment Day. Since we only discovered this after setting the date, may it prove to be an auspicious beginning for this country's succulent enthusiasts!

Dee Raymer, P.O. Box 56685, Nairobi

Communication from the Executive Committee

As indicated on the inside cover, Mr Don Young has paid for the production costs of this issue of the *Bulletin*, and the executive committee would like to thank him very much for this support. It is the first step in a new fund-raising initiative and we are most grateful for this generous help to get the programme started.

The *Bulletin* has been the mainstay of the Society's contribution to the exchange of natural history reports and news for over 80 years which, since it is produced quarterly, stands as a substantial forum for sharing biodiversity information. The *Journal* still remains the publication for more detailed, scientific reports.

With the new-look *Bulletin* the Committee wishes to signal its continued commitment to the provision of this service for members, despite the times of high inflation. It is no secret that costs of the *Bulletin* production have risen by over 100% between the two last issues and we hope that more sponsors can be found to help, especially now that we have a more attractive product.

Full or part sponsorship of an issue will be acknowledged on the inside cover of the *Bulletin*, and the editor is happy to include natural history articles provided by the sponsors, including descriptions of fauna and flora at safari camps etc. Alternatively, subscriptions of Corporate Members greatly help raise funds for the EANHS publications.

Glyn Davies, Fund-raising Subcommittee

Erratum

There are areas of bamboo in the Cherangani Hills, contrary to the statement made in the article on Mau Bongos in the last issue. GD - 16 June 1993

MEMBERSHIP:
This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society-National Museum Library (postal borrowing is possible) and copy of the EANHS Bulletin every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

JOURNAL:
The Society publishes, in collaboration with the National Museums of Kenya, the Journal of East Africa Natural History. The Journal is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Secretary, P.O. Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

EANHS BULLETIN:
This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), P.O. Box 44486, Nairobi, Kenya. Line drawings can be published. Photographs will be considered if they are essential to the article.

SCOPUS:
The Ornithological Sub-committee publishes this journal three times a year, cost KSh. 250 per annum. All correspondence to D.A. Turner, P.O. Box 48019, Nairobi, Kenya.

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Subscritions are due on 1 January. From 1 July you may join for half the yearly subscription and receive publications from that date. Application forms for membership are obtainable from the Secretary, P.O. Box 44486, Nairobi, Kenya.

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Articles and Notes

The Global Environmental Facility and the Project for Conservation of the Tana River Primate National Reserve

The Global Environmental Facility (GEF) is a fund established by the international community to assist developing countries to implement projects which benefit the global environment. The GEF is administered by the World Bank and implemented jointly by the World Bank, UNDP and UNEP. The initial 3-year pilot phase of the GEF began in 1990, with approximately US $ 1 billion to disburse world-wide for projects aimed at conserving significant biological diversity, reducing the production and release of greenhouse gases, reversing the pollution and deterioration of international waters, and reducing emissions of ozone-depleting substances.

To qualify for funding under the pilot phase GEF, projects must address one of these issues, be "incremental," (that is, be over and above what the country would reasonably undertake with its own resources or in the context of regular donor-assisted national development programmes), and also involve innovative approaches which could serve as a test and a demonstration for future initiatives. Projects may emphasise technical assistance/capacity building (the UNDP project pipeline) or direct investment (the World Bank project pipeline).

The proposed GEF project for conservation of the Tana River Primate National Reserve (TRPNR) would finance research, improved reserve management and a "community conservation programme," that is community development activities aimed at reducing pressures on the Reserve by providing economic alternatives. It meets all of the three GEF criteria described above. The Reserve represents an important remnant of the riverine forest ecosystem which has almost disappeared in Kenya and is rich in biodiversity, including but not limited to the two endangered, endemic primate subspecies (Tana River Red Colobus and Tana River Crested Mangabey) for which it was particularly established. The incrementality of the initiative derives from the fact that this internationally significant Reserve is of relatively low national priority. While the government of Kenya is presently implementing a major program to rehabilitate and improve the management of its enormous network of protected areas, this effort is focusing first on the Parks and Reserves which have high revenue-earning potential in order to establish the system on a financially sustainable basis.

The innovative aspects of the proposed project included a tight linkage between ecological and socio-economic research and the approach to Reserve management (*e.g.*, a "Population Viability Assessment Workshop" was convened to examine the long-term prospects of the Reserve and its wildlife populations under different management scenarios) and the emphasis on participation by communities occupying and using the areas adjacent to the Reserve. Another innovative component, a programme to encourage a small number of people currently residing inside the Reserve to resettle outside by providing an attractive package of resettlement benefits, was proposed initially but may be dropped due to misunderstanding, and a negative response on the part of the communities involved.

Dr Agi Kiss, Senior Ecologist, World Bank, Box 46534, Nairobi

TANA RIVER PRIMATE NATIONAL RESERVE: PRIMATE CENSUS, MARCH 1993

Conserving the endangered primate species of the lower Tana River, the Red Colobus (*Colobus badius rufomitratus*) and the Crested Mangabey (*Cercocebus galeritus galeritus*), and their riverine forest habitat, are the main objectives of the Tana River Primate National Reserve (TRPNR) (Map 1). Alarming population reductions of 85% and 25% for the Red Colobus and Crested Mangabey respectively were documented between 1976, when the Reserve was gazetted, and 1985 (Marsh, 1986). Data collected after 1985 suggest that the number of groups of both endangered primates has stabilised (Ochiago, 1991; Kinnaird and O'Brien 1991).

Despite the numerous studies carried out in the TRPNR that report continued threats to the endangered primates, recommendations to curtail these have gone largely ignored. Implementation of an effective management plan has been difficult to achieve due to budget constraints. In addition, little revenue has been remitted from tourism due to security problems throughout the Tana District resulting in few visitors since its gazettment in 1976.

In terms of the conservation of the whole ecosystem, many of the trees which are important to the endangered primates are also important to the local human communities (see Medley, this vol. and Kahumbu, this vol.). The Pokomo people, being subsistence farmers, obtain many of their household needs from the forests of the Reserve. The resultant impact through tree felling for canoes, poles and other wood products (Medley, 1990; Kahumbu, 1992) can reduce forest quality and carrying capacity for the endangered primates.

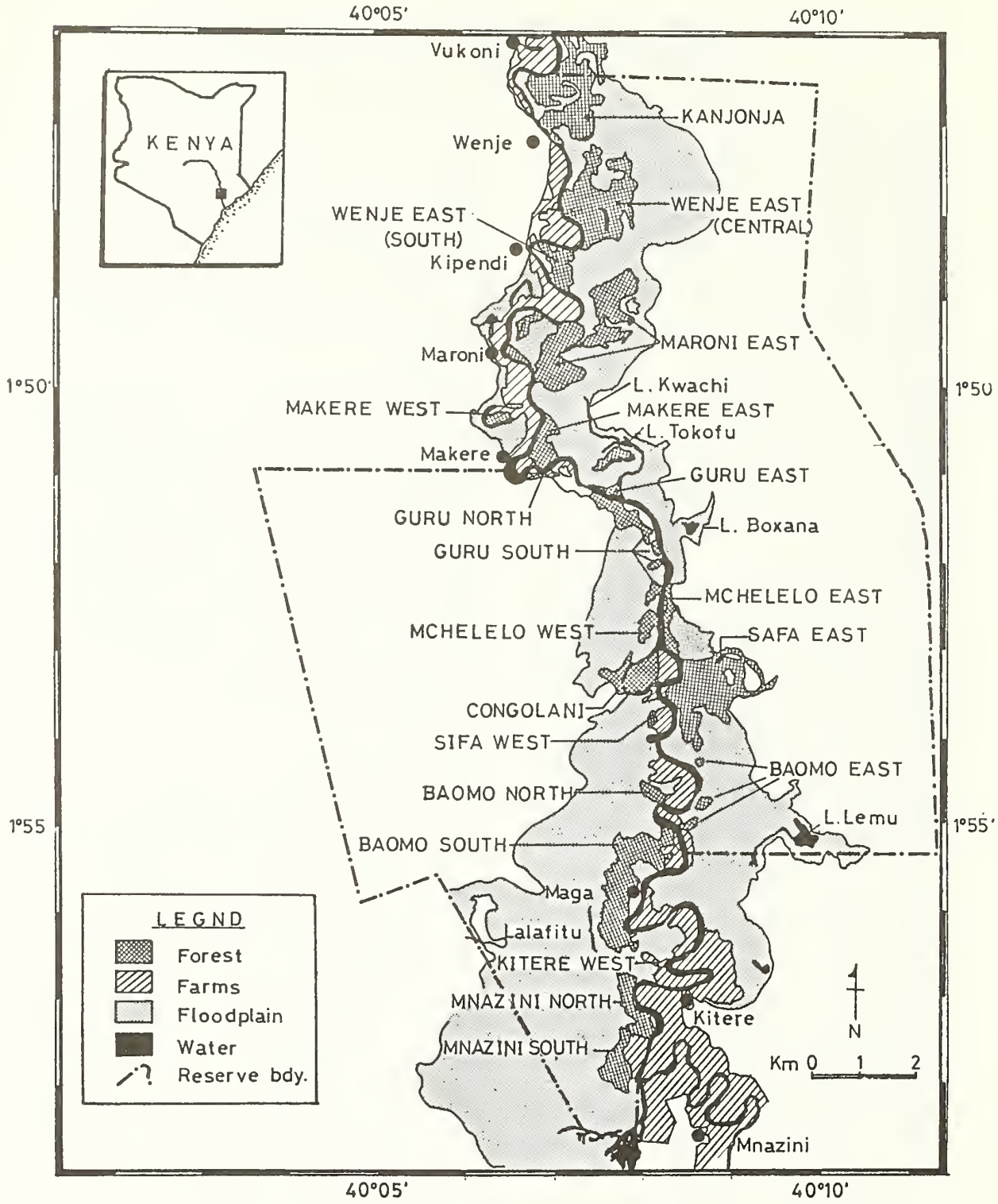
The status of the endangered primates is well documented on the west bank where data are available after many years of research; however, little is known about the much larger east bank forests where the history of disturbance is quite different because of security problems with "shifters" on the eastern side of the Tana. Observations of forest condition and disturbance were included as important additions to the census information.

The main goal of the 1993 primate census reported below was to determine the status of the endangered primate species prior to the initiation of the GEF Project. A procedure that can be easily repeated for direct comparison between consecutive years was modified from the Kenya Indigenous Forest Conservation Project (KIFCON) surveys and established. We also tested the efficacy of conducting a census with multiple teams patrolling each forest patch, versus a single team as conducted previously.

THE SURVEYS

The census was conducted over the space of one week (1–7 March), during which vehicles for road and river transport were available through Kenya Wildlife Service (KWS), who were also responsible for logistical support and provision of security for east bank work. KIFCON Project and KWS organised the activities; participants included: Tom Butynski (WWF), the late Odhiambo Ochiago (Institute of Primate Research/National Museums of Kenya), Debbie Gust (Yerkes Regional Primate Center), Geoffrey Mwangi (Moi University) and Julie Larson (Emory University), Paula Kahumbu (KWS) and Glyn Davies (KIFCON).

Each team was provided a set of maps, aerial photographs (1991), check-sheets,



Map 1: Locations and forest patches in Tana River Primate National Reserve

pens/pencils, a compass and binoculars. Survey routes were determined generally starting at one end of a forest patch and traveling perpendicular to the length of the forest patch in transects approximately 100 m apart. In wide forest patches, teams split into two and moved parallel to one another. For the Mchelelo East forest patch, a narrow forest bordering the river, we censused the primates from a dug-out canoe starting at 06:30 h.

When monkeys were observed, the census team spread out in an attempt to view the entire troop. Information recorded on check-sheets included: the species, the method of detection, the number of monkeys seen in each troop and, wherever possible, sex and age, tree species in which the monkeys were seen, time of the day, and habitat condition. For monkeys that were only heard calling, the compass bearing and distance estimated in meters were recorded and the animals were identified as a separate group. The number of primate groups and the number of individuals reported in a group represent minimum counts, particularly in the larger forest patches where animals could be missed by survey terms.

Any additional information that could be obtained from Pokomo residents in the vicinity of forest patches was also noted. If primates were not encountered but had been reported by field observers within six months of the census, this was indicated on the check-sheets.

Forest disturbance was recorded on a separate check-sheet. Species cut were identified, enumerated, aged, and measured. Each team also provided a description of the survey route with map and location of primate groups. This was usually completed in camp although ideally it should be accomplished during the census.

Twenty-five forest patches were visited, three of which were outside the Reserve. Attempts to reach the remaining patches on 7th March were thwarted by flooding. One forest patch, Mariadadi, had been cleared for cultivation between 1975 and 1985.

RESULTS

The endangered primate populations within the Reserve comprise 18 Red Colobus groups plus two solitary males, and 30 Crested Mangabey groups plus one solitary male (Map 2; Table 1). In addition, we counted 59 groups of Sykes' monkeys plus a solitary male, and 24 Baboon troops. This is a total of 131 groups of primates occupying approximately 11 km^2 of riverine forest within the boundaries of the Reserve; 107 of these primate groups depend exclusively on the riverine forest for their existence.

Red Colobus

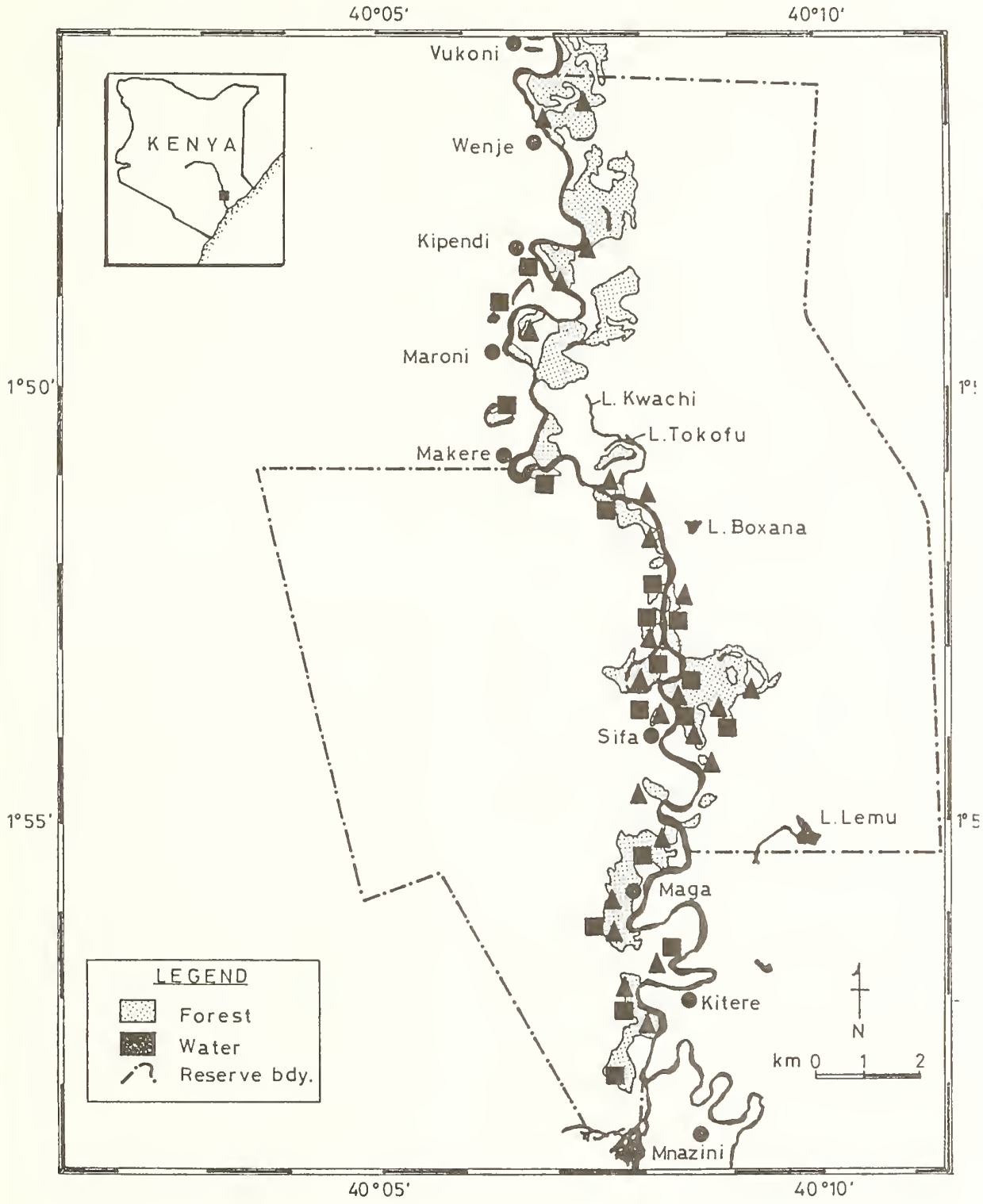
Fifteen groups of Red Colobus were recorded in 15 forest patches on the west side of the Tana River. These include three Red Colobus groups outside the Reserve, two observed in Kipendi/Maroni forest and one reported in Makere West. In addition, two solitary male Red Colobus were observed in Guru North and Guru South forest patches.

Reports of Red Colobus monkeys were made from two forest patches, Sifa West and Maroni West, where they had not been recorded since 1975. Similarly, Red Colobus were found in Kitere West in 1991 after they had been reported absent since at least 1985. All of these groups occur in sub-optimal habitat. Kipendi/Maroni and Makere forest patches comprise thin ribbons of trees that are now separated from the river by agriculture. Further encroachment was observed in Kipendi/Maroni where farm expansion is pushing farther into this degraded forest. The vegetation consists of thorn bush and thick undergrowth with low tree density. Tree composition is dominated by forest-savanna transition species such as *Garcinia livingstonei, Acacia robusta*, and *Newtonia erlangeri*. Red Colobus food trees present include *A. robusta, N. erlangeri* and

Table 1: Number of Primate groups per forest patch

Forest	E/W	Red Colobus		Crested Mang.		Sykes		Baboon	
		90	93	89	93	85	93	85	93
Kipende	W	2	(1)	-	0	1	2	1	2
Maroni	W	0	1	-	0	-	1	-	0
Makere	W	1	(1)	-	0	-	0	-	1
Guru North	W	1	1[1]	2[1]	0	5[1]	1	-	0
Guru South	W	1	2[1]		2		6	-	0
Mchelelo	W	1	1	1	2	3	4	-	1
Congolani W	W	0	0	0	0	1	0	-	1
Congolani C	W	1	1	2	1	2	3		0
Sifa W	W	1	1	0	1	0	1		1
Hadribu	W	-	-	-	-	0	-		-
Baomo North	W	0	0	1	1	2	2		2
Baomo South	W	3[2]	2	3[2]	2	4–5	2	3[2]	3
Lalafitu	W		1		1		2		0
Kitere	W	0	1	1	1		1		1
Mnazini N	W	2	1	2	2	3	3	0	1
Mnazini S	W	1	1	1	0	4	1	2	3
Mbuji	W		-		-		-		-
Bubesa A	W		-		-		-		-
Bubesa B	W		-		-		-		-
Kinyadu	W		-		-		-		-
Kanjonja	E	0	-	2	-	5[3]	-		-
Wenje N	E	0	0	2[4]	3		8		2
Wenje C	E	0	0		1		3		1
Wenje S	E	0	0		2		4		1
Maroni	E	0	0	1	1		3		1
Makere	E		0		0		1		0
Guru	E	1	0	1	1	1	1		1
Mchelelo	E	0	1	2	1	1	2		1
Sifa	E	2	5	3–5	6[1]	3	7		5
Baomo	E	-	0	1	1		4		0
Mnazini	E	-	-	-	-	-	-	-	-

[1] – Guru North and South considered one forest
[2] – Baomo South and Lalafitu considered one forest
[3] – Kanjonja and Wenje East considered one forest
[4] – Wenje East patches all considered together
[1] – Solitary male
(1) – Reported but not observed



Map 2: Position of Red Colobus and Crested Mangabey groups; Triangles:Crested Mangabey; Squares: Red Colobus

Ficus sycamorus. Similarly, Sifa West, once abutting the Congolani Forest, comprises a small patch no longer adjacent to the river. Unlike the forests mentioned above, Sifa West does contain mature forest with prime Red Colobus food trees, but it must be considered sub-optimal habitat due to its small size (3 ha). This forest was reduced from 30 ha (Marsh, 1976) sometime between 1976 and 1985 (Decker, 1989).

On the east bank of the Tana River, we enumerated a total of six Red Colobus groups. These were all observed in Mchelelo and Sifa East patches. Both forests comprise excellent forest habitat that are currently undisturbed by humans, although evidence of human activity about ten years ago was found. Sifa East is a very large patch that borders the river to the west, and an old river course to the east. This creates a very heterogeneous forest with water available some distance from the main river course.

Also Wenje East forest patches appeared to contain prime forest, but Red Colobus were conspicuously absent in all east bank forests north of Mchelelo, and were even reported absent from these areas in 1975 (Andrews *et al.*, 1975). These forest patches have clearly expanded since 1969 when most of the east bank was occupied by farms as indicated by large old mango trees which are still present within the forests.

Crested Mangabeys

Inside the Reserve, 14 groups of Crested Mangabey were enumerated on the west bank and 16 groups observed on the east bank. All east bank forest patches, except Makere East, had mangabeys. One solitary male was found in Sifa East where there were six groups also observed. No solitary mangabeys were observed on the west bank, nor were any groups found outside the Reserve.

Baboons and Sykes' monkeys

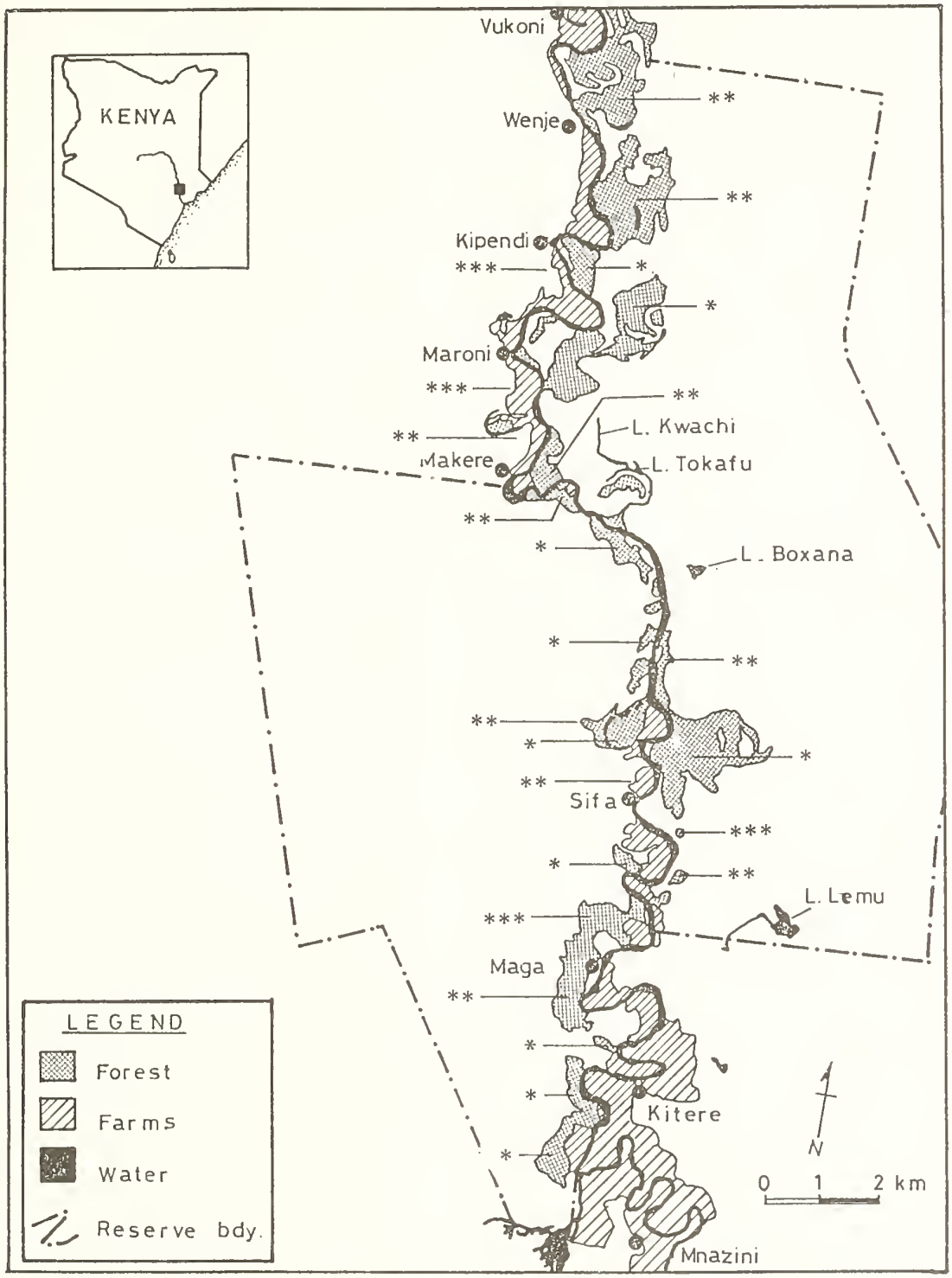
Sykes' monkeys are by far the most numerous primates in the Reserve's forests with 59 groups counted. They were recorded in all censused forest patches except Congolani West. High densities (more than five groups) were recorded in Guru South Forest, Wenje East (North), and Sifa East. In 1985, 35 groups were reported for the Reserve with high densities in Guru forest (North and South combined), Wenje East (North) and Baomo South (Marsh, 1986).

The number of baboon groups was low compared to the other forest primates (24 groups). Their density is typified by only one or two groups in most forest patches, except in Baomo South and Sifa East where three and five groups were encountered, respectively (Table 1). This differs from the situation in 1985 when only nine baboon groups were counted, with over half the population in Baomo South and Mnazini South.

PATTERNS OF CHANGE

Overall, the picture of endangered primate density and distribution is little changed since the last censuses (1988 and 1990). The number of Red Colobus groups enumerated on the west bank compares favourably with the 14 Colobus groups recorded during the 1990 census. On the east bank we reported much higher numbers of groups for both endangered primates. This, however, may reflect more thorough surveys than conducted in 1985. (In 1990, primates were not censused on the east bank due to security restrictions; however, at least one Red Colobus group was sighted from across the river.) Red Colobus group numbers are likely to be underestimates. Unlike Crested Mangabey, Colobus do not make loud calls that reveal additional groups not sighted.

Red Colobus were observed in forests where they had not been reported recently. Earlier studies suggest that Colobus move between groups and forest patches. Marsh (1976) observed group size changes from 15



*Map 3: Indicators of forest disturbance/condition; * Excellent condition; ** Moderate disturbance with regeneration; *** Recent intense destruction*

to 30 in six months. In order to colonise Sifa West, these animals would have had to cross some fairly open area or dense bush. This explains the presence of this species in Kitere West after being reported absent for at least two years. Clearly the Tana Red Colobus is not quite as immobile as has been previously believed. Nonetheless, it is generally considered an arboreal species that rarely descends to below 10 m, and thrives in mature forest where its diet comprises mainly unripe *Ficus sycomorus* fruit as well as the young leaves of *Sorindea madagascariensis, Pachystela msolo*, and *Cynometra lukei* among others.

The mean group size observed for Colobus (8.5, n=12), Crested Mangabey (8.2, n=12), Sykes' Monkey (4, n=20) and baboons (24.4, n=5) are certainly underestimates. Data from habituated groups of each species were used to obtain more realistic group sizes; four of these groups were in Wenje Forest. For Red Colobus, we estimate the Reserve's total population, using 10–15 animals per group (Ochiago, 1991), to be 180–270 animals. For Crested Mangabeys, we used a group size range of 18–24 (Kinnaird and O'Brien, 1991), giving a total population of 540–720 animals in the Reserve versus approximately 512 in 1989. Our total group numbers and population estimates for the Reserve suggest higher numbers of Crested Mangabey than reported previously, particularly on the east bank. It is uncertain as to whether these results reflect real changes as east bank surveys were not thorough in the past (M. Kinnaird, pers comm.). Group sizes, on the other hand, may be increasing as illustrated by the Mchelelo forest group, which comprised 17 animals in 1989 versus 38 this year.

Although the number of baboon groups is low in comparison to the other primate species, this could reflect a large number of baboons as group size is generally large. Although we sighted, on average, only 24 baboons per troop, we know from detailed studies around Mchelelo that baboon troop size ranges from 75 to 185 individuals. It is not known whether troops this large are found throughout the Reserve.

Threats to the Forests

Threats to Red Colobus groups within the Reserve include continued forest clearing and the extraction of wood and other plant parts such as palm fronds. Forest clearing for agriculture was observed in prime Red Colobus habitat in Baomo South where approximately 8 ha was cleared in November 1992. Although this has been recognised as an illegal activity, the party responsible has already harvested two seasons of maize, and is currently planting mangoes, bananas and beans. It is probable that natural regeneration could quickly reclaim the site. There is, however, a danger of the soils becoming depleted: while some of the maize appeared to be vigorous, in other areas it was doing extremely poorly (See also Njue 1992). Few large figs (*F. sycomorus*) were left standing and most of the cut pole size figs have coppiced. Fire was used as a clearing tool.

At Lalafitu 1 ha was cleared in January 1993, but no cultivation has taken place. Other threatened forests include Baomo North, Mnazini North and Mnazini South. Pole cutting is intense in these forests; in the latter two evidence of tree cutting for canoes and charcoal production were observed. Charcoal production is an activity previously unreported for the Reserve. It is suspected that, with the opening of the main road from Malindi to Garissa after a particularly long closure due to flooding, charcoal is being produced for sale.

Forest disturbance patterns were predictable (Map 3). Those forests adjacent to villages or farms were the most severely threatened through the removal of poles and clearing for farming. Forest clearing is on the increase, especially in the Baomo area; this is likely to be a consequence of individuals of the Baomo community's expectation for

compensation for resettlement based on shamba size. This must be stopped immediately before further forest loss occurs. Regeneration of these cleared areas should be allowed to take its course.

RECOMMENDATIONS FOR FURTHER STUDIES

While the objectives of this census were to establish the status of the TRPNR's endemic primate populations, future censuses can be designed to obtain additional important information. The monitoring of these species is of great importance considering their endangered status, and any management decisions require detailed information on group size, patterns of reproduction *etc.* It is possible in the Reserve to collect more demographic information by conducting the census over a longer period of time, to allow for repeated surveys and counts, and to establish better estimates of group size and composition.

Continued research in the Reserve must attempt to address east bank forest patches. Sifa East, a large, relatively undisturbed forest patch (approximately 150 ha) was found to contain a surprisingly high number of primate groups. With five Red Colobus groups and six Crested Mangabey groups, this represents the largest population of the endangered primates in any of the Reserve's forest patches. On the west bank, Guru, Mchelelo and Baomo South are still important sites for both endangered primates.

While this census provides a baseline for future monitoring of the endangered and other diurnal primates found in the gallery forests of the Primate Reserve it is insufficient for determining the status of the species over their entire ranges. Future censuses should attempt to cover all Tana River forests and those in the Tana Delta, in order to establish accurately the status of these species.

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Acknowledgments
This census was conducted as part of the World Bank Global Environment Facility (GEF) pre-project activities. These data will be used as part of the on-going Red Colobus and Crested Mangabey population monitoring programme, as well as a baseline for monitoring the achievements of the GEF Project after initiation.

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MCHAMBIA (*Pachystela msolo*): AN INDICATOR OF FOREST CONDITION IN THE TANA RIVER

The Tana River Primate National Reserve (TRPNR) was established in 1976 to preserve the endangered and endemic Tana River Red Colobus (*Colobus badius rufomitratus)*, and Crested Mangabey (*Cercocebus galeritus galeritus*), and the best remnant riverine forest in Eastern Kenya. The Kenya Wildlife Service places protection of biodiversity as a most important goal, including rare plants and animals and the complex of species characteristic of the region. That goal is assessed through the ecological monitoring of forest condition. Whereas the primate populations may indicate changes in riverine forest habitat and the availability of food resources, the dynamics of the vegetation and representative plant species are more directly linked to physical and human disturbances. Plant species respond to changes in the environmental regime, forest-community structure adjusts, and the primates adapt with varying degrees of success. Vegetation parameters, which serve to document ecological change, are of critical importance to any monitoring programme. In this paper, I summarise biogeographic, resource, and ecological attributes of one tree species, *Pachystela msolo* (Engl.) Engl. (Sapotaceae) and show its potential value as an indicator species of forest-ecosystem condition in the TRPNR.

BIOGEOGRAPHIC PATTERNS

Pachystela msolo, a tree species identified in earlier studies as *Pachystela brevipes* (see Homewood, 1976; Marsh, 1978; Hughes, 1988), is known to occur in East Africa only along the lower Tana River and the slopes of the East Usambara Mountains in Tanzania (Medley, 1992). This distribution pattern corresponds closely with the Crested Mangabey and Red Colobus and suggests a similar migration route from west-central Africa during a warmer, wetter climate (*ca* 8000 BP; Homewood and Rodgers, 1981; Livingstone, 1974). Presently the tree occurs along the Tana River from Hewani near the Delta, upstream about 60 kilometers to Pumwani, just north of the TRPNR. Long-term shifts in the distribution of the tree, a consequence of climate change or upstream impacts on river flows, may indicate expansions or contractions in the primates' respective ranges.

From a sample of twelve forest areas studied between 1987 and 1988 in the TRPNR, I compiled an ecological summary of local riverine forest vegetation (Medley, 1990). *Pachystela msolo* is the most abundant tree at the canopy forest layer (trees larger than 20 cm diameter at breast height, dbh), accounting for 21.5% of the total tree density.

The tree shows a clustered distribution characterised by the occurrence of nearly monodominant mature stands (in four of twelve study areas). Colobus and Mangabey populations are found in all forests with mature *P. msolo* and the tree was principally important in predicting intraforest primate ranging patterns in the three forest areas (Medley, 1993a). Local occurrences of *P. msolo*-dominated stands appear indicative of suitable if not superior primate habitat.

RESOURCE VALUE

Clearly a partial explanation for the association between the tree and the primates is its value as a food resource. In the Baomo South forest, Decker (1988) found that the leaves, flowers and fruit of the tree provided over 27% of the Red Colobus diet between 1986 and 1988. Flowers alone, which are produced continuously, provided more than 14% of their diet. Similarly in Mnazini North, Kinnaird (1990) found that the flowers and fruit of *P. msolo* were among the top food items for the Crested Mangabey between 1988 and 1989. High use by the primates and the record of continuous flower production in a very seasonal environment emphasise its resource value for the endangered primates.

Likewise, *Pachystela msolo* and the land areas where the tree dominates are highly valued by the local Pokomo (Medley, 1993b). The deeply-fluted trunk of Mchambia limit its value for canoes, but sections of the trunk are frequently extracted for canoe oars and spoons. Most importantly, mature stands of trees occur adjacent to oxbow lakes and on flooded low-levee sites. These sites are also suitable for agriculture and are the primary areas of forest clearings, burns, and the expansion of cultivated lands. Human influences on standing mature trees and the loss of mature forest areas, particularly adjacent to Pokomo settlements, provide a measure of the level and changing influence of human activities in the region.

FOREST DYNAMICS

Of critical importance to any monitoring program in the TRPNR is some measure of how a particular forest patch, or how the mosaic of forest types, changes through time. Given the observed value of mature *Pachystela msolo* stands as primate habitat, the establishment, growth, recruitment, and death of this species may indeed provide a partial measure of habitat sustainability in the protected area. A study of the size-class abundances of tree species dominant in the forest canopy suggests that regeneration is at least partly dependent on their position relative to the river channel and the consequent floodplain disturbance regime (Medley, 1990). *P. msolo*, presently most abundant in the large-tree size class (>20 cm dbh) shows the lowest relative abundance of all canopy-tree species in the sapling size class (>1m ht and <10 cm dbh). Large areas of significant regeneration by *P. msolo* were not measured or observed, thereby questioning its persistence as the most abundant tree. Furthermore, stand-level mortality is reported for Congolani West (Marsh, 1976), and Baomo South (Marsh, 1976; Medley, 1990) in response to major flood events in 1961 and 1969, respectively. Both the establishment and death of *P. msolo*-dominated stands seem closely linked or sensitive to conditions and changes in the floodplain regime. This sensitivity, as documented through long-term study, should prove a valuable measure of environmental change and the sustainability of high-quality primate habitat.

CONCLUSIONS

Ecological monitoring in the TRPNR will be directed at a record of biodiversity patterns over local-regional geographic scales and attempt to predict and manage for long-term trends. Appropriate measures, therefore, are species or community assemblages that appear particularly sensitive to environmental

change. Furthermore, preservation is goal-directed, and of special concern is the viability of endangered primate populations. Any ecological monitoring programme should address questions of riverine forest extent, community structure, human influence, and the quality of habitat for the endangered Red Colobus and Crested Mangabey. *Pachystela msolo* is not only a species of importance to the primates, but appears to show sensitivities in its biogeographic range, susceptibility to destructive and extractive human use, and its tolerance of local floodplain conditions. The tree is a majestic feature of the TRPNR forests, and potentially a valuable indicator of long-term environmental change in a complex ecosystem.

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THREATS TO *Ficus sycomorus* IN THE TANA RIVER PRIMATE NATIONAL RESERVE

Among botanists and students of coevolution, figs have always been popular subjects. The family *Ficus* contains over 700 species that have a unique mutualistic relationship with their pollinator wasps. Many forest ecologists recognise figs to be keystone species that play crucial roles in forest ecosystems (see Mirsky, 1992). The mutualistic relationships

of figs make them vulnerable to habitat fragmentation and loss; since figs depend on female agaonid wasps for pollination, and the wasps require the fig for laying eggs, growing, food and mating; neither species can exist without the other (Bronstein and McKey, 1989). The reproductive cycle of wasps and figs has been well documented (Janzen, 1979; Galil, 1979) and begins with pollen laden female wasps seeking out syconia, fig fruiting bodies, which are small hollow receptacles lined with hundreds of male and female florets. These tiny wasps enter a syconium via the ostiole, a small bracket-covered pore. Only female florets are receptive at this early stage of syconium development, and the wasps deposit pollen on the stigmas and then oviposit directly into some of the ovaries through the style. After several weeks the male wasps mature and emerge, locate females and inseminate them before they emerge. The males then burrow a tunnel to the exterior through the wall of the syconium, then suffer a sudden death. The exit is used by the females who emerge next to search for other syconia in which to oviposit. As they exit, female wasps collect pollen from the anthers of the now mature male florets, and the cycle is repeated.

The viability of mature fig populations depends on the number of mature trees necessary to ensure the year round availability of figs receptive to wasps. The minimum population size of a viable fig population is large and depends on a number of aspects of reproductive timing that influence the probability of pollen-laden wasps finding another receptive fig tree (Kjellberg and Maurice, 1989).

With the current rapid rates of tropical forest destruction, forest ecologists are becoming increasingly concerned about the conservation of these keystone species (Mirsky, 1992). *Ficus sycomorus* is a typical member of the fig family, producing approximately 30,000 syconia per fruiting episode and these may be as frequent as every two months. Although fruiting episodes are distinct in each tree, with ripe fruit lasting for only four to seven days, within the fig population some trees are in fruit at all times of the year. This makes them a reliable food source for forest frugivores, and they can be especially critical in seasonal environments that experience dry seasons or occasional droughts. By maintaining frugivore populations during times of fruit scarcity, figs play and additional role of maintaining the animal species critical for the dispersal and recruitment of many trees at other times of the year (Howe, 1984). In the Tana riverine forests, *F. sycomorus* seeds have been found in the droppings of duiker, bush pigs, six primate species and fruit bats. Many birds, especially hornbills, Fisher's Turaco, bulbuls, weavers, mouse birds and green pigeons were frequent feeders on ripe figs (pers. obs.)

In the Tana River National Primate Reserve (TRNPR), *F. sycomorus* is one of the most important fruit resources for the two endangered and endemic primates, the Red Colobus and the Crested Mangabey. This fig is also important to the local communities for the construction of dug-out canoes, an essential means of transport on the Tana River. *F. sycomorus* is a riverine species that grows to over 25 m tall and over 4 m wide (Galis and Eisikowitch, 1966). It is found throughout much of Africa and the Middle East, and has been cultivated in the Mediterranean.

A study in 1976 in the TRPNR predicted that the predominant use of this species for canoes would lead to its disappearance within 30 years (see Marsh, 1976). Harvesting of *F. sycomorus* could have devastating impacts on the fragmented and degraded Tana riverine forests and the endemic primates. It is a staple for the Red Colobus making up 20 to 30% of its annual diet (Marsh, 1976; Decker 1990), and the Crested Mangabey relies on this fig during. lean periods when it can constitute 80% of its monthly diet (Kinnaird, 1990).

My study (Kahumbu, 1992) investigated

the sustainability of harvesting of fig trees for canoes by using a population projection model that predicts what the future populations and dynamics of figs will be, based on life history characteristics and current felling rates. I found that of nine forest patches, *F. sycomorus* was regenerating in only four, and that only one of these sites had a growing population of the species. The matrix model demonstrated the site specific demographic trends and predicted that only one tree could be sustainably harvested per annum at only one site. In an analysis of the canoes currently in use, I calculated that five to eight *F. sycomorus* trees were felled annually for canoes. Although this species makes the least durable canoes of all tree species used (they last for only one year), they are often selected because the tree grows close to the river and the soft wood makes it easy to cut and carve out. Ease of construction may be a determining factor in tree choice.

The study also revealed that *F. sycomorus* felling for canoes was unlikely to be the greatest threat to the species. More trees of this species were felled for beehives, and the regeneration sites close to the river were mostly occupied by subsistence agriculture. To ensure the long term survival of the endemic primates this tree species must be protected. Since *F. sycomorus* makes such poor canoes I recommended that alternative materials for the construction of canoes and beehives should be investigated. To make the canoes more durable, I painted eight with waterproof paint. I also recommended that the area under cultivation be reduced to allow natural regeneration of this fig and the forests to continue.

While conducting this study I became aware of the significance *F. sycomorus* has played in the past. In Egypt it played an important role in the economy and culture as a timber, fruit and shade tree and it was used for the coffins of some of the earliest kings (Berg, 1989; 1990). This is also the biblical sycamore tree that Zacharius climbed. *Ficus sycomorus* has undoubtedly played more important roles to the local Pokomo people. Apart from its predominant use for canoes and beehives, it is also used for drums (Medley, 1990) and it is often the only tree left standing on shambas after clearing. In many villages, meetings are held beneath a large fig tree and pole sized fig trees are sometimes used to mark the boundaries of shambas. The fruit of this species, though succulent and sweet, are usually filled with insects and grubs and are only eaten by children and during severe droughts. The cultural values of this fig is not unusual, and Salvadori (EANHS (20) no. 3 and 4) refers to the values and uses of various other fig species to the Meru and other tribes in Kenya.

Traditional values in the lower Tana area, however, are deteriorating and there appeared to be little control on felling of any species. Prior to the Chiefs Act, these forests were managed by the council of elders who had strict regulations on which trees could be felled, offenders were dealt with severely (Decker, 1990; Bunger, 1979). Some of the best remaining patches were set aside for magicians and medicine men. With the loss of power held by the council of elders or "Wazee wa Gaza", went traditional values of the forest resources. In 1992, one year after I completed my study, a 12 ha *F. sycomorus* grove was cleared and cultivated.

Acknowledgments

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TANA RIVER DELTA: UPDATE

The Tana River is the largest river in Kenya with a mean annual flow of about 180 cubic metres per second. It is the only river with continuous flow that forms a delta on the dry coast of Eastern Africa. The delta begins near Garsen where a series of old river channels fan out in a "delta" shape to reach the coast some 40 to 50 km away in Ungwana Bay. It is the largest delta ecosystem in Kenya. It is also a unique ecosystem characterised by a large number of habitats rich in biological diversity.

The habitats include: coastal waters with coral gardens and seagrass beds, sandy beaches, tidal wetlands, freshwater wetlands, riverine wetlands, sand-dune forests, mangrove forests, riverine and floodplain forests, grasslands and bushlands. The high diversity of habitats and biota is the result of a dynamic equilibrium of hydrological conditions, soils and topography including marine influences.

Wildlife

The delta supports vast numbers of wild herbivores: nearly 10,000 topi, thousands of waterbuck, buffalo, hippos, about 100 elephants, and an occasional rhino. The Delta contains the largest concentration of crocodiles in Kenya and is nesting site for the endangered marine turtles. Dugongs have recently been sighted in the offshore waters with increasing frequency. The riverine forest patches are habitats for two endemic and

critically endangered subspecies of primates, the Tana River Red Colobus (*Colobus badius rufomitratus*) and the Tana River Crested Mangabey (*Cercocebus galeritus galeritus*). Surviving populations are estimated to be 300 to 400 individuals for the Red Colobus and 800 to 1000 individuals for the Crested Mangabey. There are no captive populations of either subspecies. The sand-dune vegetation has a high percentage (about 50%) of endemic plants.

Ecological Functions

Wetland habitats in the Delta, including their seasonal dynamics of flooding and drawdown phenomena, account for the basis of the rich and diverse freshwater fisheries. Extensive mangrove wetlands, seagrass beds and coral gardens provide vital habitats for various marine crustaceans and fish.

The timing, extent and duration of flooding, vertical and horizontal water circulation transports nutrients, flushes away wastes, controls salinity, and spreads larval stages of fish and nurtures them to very high population levels. In addition to supporting a vast array of biodiversity, the freshwater and marine wetlands filter the heavy river sediments so that the water that finally reaches the ocean has a reduced load of silt which would otherwise "smother" the coral, seagrasses and marine animals.

Socio-economic Activities

Traditional land use activities of pastoralism, fishing and small-scale agriculture have maintained the ecological balance of the Tana Delta for thousands of years. Freshwater wetlands within the delta proper provide dry season and drought fallback grazing areas for most of the Orma and Wardei livestock from Tana, Lamu and Garissa Districts. The Pokomo ethnic group carries out small-scale agriculture in narrow strips along both sides of Tana River. For many generations, the most common type agriculture practiced has been recession flood irrigation. The regular floods played an important role in replenishing soil nutrients.

Threats

The Tana River Delta is threatened by several development projects in the upper catchment and proposed projects within the Delta itself. These development projects have been planned on the basis of a weak database on the linkages of the Delta with the wider environment especially with regard to the roles, values and economic importance of wetlands. Examples of these include: the hydroelectric power dams in the upper catchment, Tana Delta Irrigation Project, and Coastal Aquaculture prawn and fish farms. In July 1993, H.E. President Moi directed that the Tana River Delta be protected as a wetland of international importance, and that an environmental impact assessment and management plan be developed for the delta ecosystem.

Tana Delta Wetlands Steering Committee

In September 1993, the Tana Delta Wetlands Steering Committee was established under the aegis of Tana and Athi Rivers Development Authority (TARDA) to formulate an immediate action plan, specifying the activities to be carried out with the broad guideline of protecting the delta environment within the framework of an environmental assessment and management plan. The Steering Committee includes:

- TARDA
- Kenya Wildlife Service (KWS)
- East African Wildlife Society (EAWLS)
- Coast Development Authority (CDA)
- National Environment Secretariat (NES)
- National Museums of Kenya (NMK)
- Permanent Presidential Commission on Soil Conservation and Afforestation (PPCSCA)
- Kenya Association of Tour Operators (KATO)
- Tana River DDC
- Tana River County Council

Apart from these, there are also two representatives from the local communities of Tana Delta. IUCN - The World Conservation Union was invited to participate in the Steering Committee as a co-opted member. Among the activities that the committee is considering are an environmental assessment study and an environmental awareness programme. These two activities are planned to start before the end of 1993.

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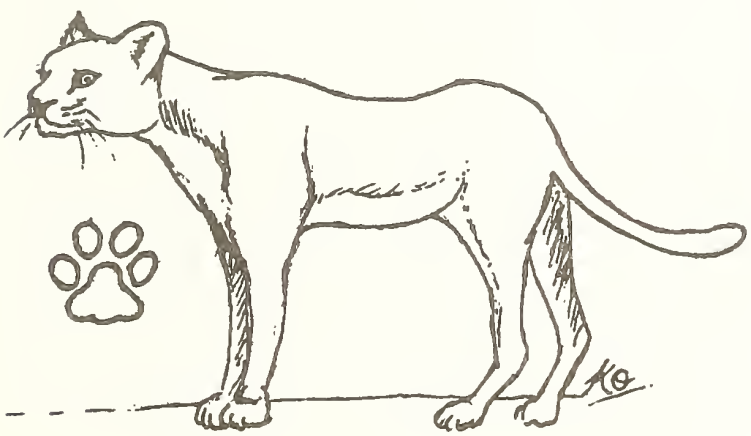
GOLDEN CAT IN ARABUKO-SOKOKE FOREST?

While conducting research on the endangered Sokoke Scops Owl (*Otus ireneae*) in the Arabuko-Sokoke forest along the Kenyan coast, I encounter numerous nocturnal mammals such as African Civet, Genet Cat, Greater and Lesser Galago, Bushbaby, Four-toed Elephant Shrew, various species of bats, African Hare, Suni, Elephant and Mongoose. Nocturnal birds seen (apart from the Sokoke Scops Owl) include African Wood Owl, Verreaux's Eagle Owl, Barn Owl and Fiery-necked Nightjar.

My initial studies were based on population estimates and densities of the Sokoke Scops Owl and whether there were any differences in the northern and southern parts of the forest where they occur in *Cynometra* forest on red magarini soil. My northern study site is close to Jilore Forest Station at the northern most tip of the forest. While driving to one of my study sites near Jilore one night, I came across a cat sitting right in the middle of the road. The animal, although slightly smaller in size was extremely well built, almost leopard-like in appearance with powerful shoulders and a long tail. It lacked spots and its colour was golden to fawny brown. The first impression I had was that of a Caracal; however Caracals have a much shorter tail and distinct pointed ears with very conspicuously long terminal ear tufts, both of which were lacking in this animal.

I have now seen it on several occasions (twice with cubs) and have made drawings of its paw marks. It was normally seen at dusk walking along the Cynometra forest road track. Efforts to photograph this animal have proved fruitless. I am now convinced that this animal is definitely the African Golden Cat (*Felis aurata*). Haltenorth and Diller's field guide to the mammals of Africa describe the Golden Cat's distribution as ranging from Gambia to Western Kenya, while its habitat is described as rainforests in lowlands and mountains, as well as occurring in forest edges. Maberly's Animals of East Africa describes Golden Cat as a large wild cat with colour ranging from golden brown to grey. Maberly also mentions that the Golden Cat is strictly a dweller in dense forest, and very rare in Kenya. Other researchers and local residents also mention having encountered a "strange cat-like creature" in the



forest.

In 1983, certain members of an ICBP team conducting a habitat assessment in the Arabuko-Sokoke forest mentioned the sighting of a similar cat during one of their sampling sessions.

The Arabuko-Sokoke forest is indeed a unique habitat with lots of amazing creatures. I now keep my camera on my lap every time I drive into the forest at night in the hope of seeing this rare animal again. If anybody has seen a similar cat in the Arabuko-Sokoke forest or anywhere else in Kenya, kindly do get in touch with me. With the forest having many endemic species, we might be onto a new species!!! Sokoke Cat perhaps.

Munir Virani, Sokoke Scops Owl Project, Box 33, Watamu

It is worth noting that two sightings of the Golden Cat were reported from the Aberdare Forest and the Aberdare National Park in 1979 (Hardy, 1979; Watson, 1980). Both of these reports give descriptions similar to the one for Arabuko-Sokoke. They form an important geographical link to the eastern side of the Rift Valley, since in Kenya the Golden Cat is a west African species, and specimens have only be collected from the Mau Forest (Toschi, 1946). It is still a long way, through unforested land to travel directly from the Aberdares to Arabuko-Sokoke, but the Tana River could act as a "forest bridge" between the Kenyan Highlands and the coast. Western African mammals do occur there, as indicated by the articles on primates in this issue.

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Glyn Davies

NOTES ON FOREST PATCHES ON MTORWI MOUNTAIN, SOUTHERN TANZANIA

The crystalline ridge of Mtorwi mountain (09°04'S–34°01'E) forms the northern edge of the Kitulo plateau. We visited the area in April 1992. In the grassland saddle crossed by the Ikuwo to Makete road at 2700 m the rare *Moraea callista* was found with most plants in fruit, but one or two still flowering, together with the yellow *Moraea tanzanica.* With the exception of the forested Numbi Valley and some forest patches, much of the mountain is covered by grassland, which can contain some rather interesting plants, especially among rocky outcrops (Lovett *et al.*, in press). This has not always been the case, and it is likely that originally much of the lower slopes of Mtorwi were forested. Forest species still occur even on the ridgetops at 2750 m among exposed rocky outcrops, for example stunted *Rapanea melanophloeos* and *Clausena anisata* are found growing out of cracks. On the north-eastern slopes some forest patches remain, often in valleys. The most likely cause of forest loss is fire, which can push back edges of forest patches and enter the forest itself following disturbance resulting from timber extraction, gathering of other forest products such as building poles, and cattle grazing. The sound of panga against wood was heard all the time we were there. Trees and shrubs in a forest clump with a canopy height of 15–20 m at 2450 m elevation crossed by the Ikuwo to Makete road on

the north-eastern flank of Mtorwi included:

Trees: *Agauria salicifolia*, *Allophyllus* sp., *Aphloia theiformis*, *Apodytes dimidiata*, *Bersama abyssinica*, *Canthium* sp., *Casearia battiscombei*, *Cassipourea malosana*, *Cussonia spicata*, *Disopyros whyteana*, *Faurea saligna*, *Hagenia abyssinica*, *Ilex mitis*, *Juniperus procera*, *Lepidiotrichilia volkensii*, *Myrica salicifolia*, *Mystroxylon aethiopicum*, *Nuxia congesta*, *Olinia rochetiana*, *Podocarpus latifolius*, *Polyscias fulva*, *Psychotria mahonii*, *Rapanea melanophloeos*, *Scolopia stolzii*, *Syzygium guineense* x *cordatum*, *Trichocladus ellipticus*, *Vepris stolzii*, *Vitex* sp.

Shrubs: *Buddleja salviifolia*, *Choristylus rhamnoides*, *Clausena anisata*, *Draceana afromontana*, *Draceana laxissima*, *Maytenus acuminata*, *Myrsine africana*, *Rhamnus prinoides*.

Lianas: *Embelia schimperiana*, *Jasminium goetzeanum*, *Urera hipsidulodendron*.

Larger herbs: *Lobelia gibberoa*, *Sparmannia* sp.

On the edges: *Dodonea viscosa*, *Heteromorpha arborescens*.

Acknowledgments

I am grateful for the good company of Ivan Bampton and Colin Congdon. Permission to conduct research in Tanzania was granted by the Tanzania Commission for Science and Technology.

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A NEW LOCALITY FOR *Zenkerella perplexa* IN TANZANIA

The leguminous tree *Zenkerella perplexa* Temu must surely rank as one of the rarest plants in the world. Only described as recently as 1990 by Dr R.P.C. Temu of the Dept of Forest Biology, Sokoine University in Morogoro (Temu, 1990), it was previously only known from a single tree on Bondwa in Northern Uluguru Mountains.

However, when recently going through some sterile reference collections I had made on Malundwe Hill in Mikumi National Park (Lovett and Norton, 1989) in October 1983, I found a *Zenkerella* that I had failed to name. I was amazed to discover that the material exactly matched the description given by Temu for *Zenkerella perplexa*, and it appears that this remarkable species is now known from two trees in different localities!

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Field trip report

TANA RIVER, DECEMBER 1992: A PERSONAL JOURNEY

THE LAND

From Malindi the road travels due north towards Garsen, coastal scrub and cultivation gradually changing to arid bush country, vibrantly green after three weeks of rain The road is rutted, pitted and sparsely traveled. A side road turns right to Tarasaa.

Here, characteristic trees include *Terminalia*, covered with white blossoms or purple seedpods, small *Combretum* with four-angled pods, an *Acacia* with rusty yellowish bark and bright yellow flowers, and round clumps of *Acacia mellifera*. One startling shrub in the milkweed family has white star-shaped flowers with long trailing red lobes. In the wet sand an assortment of small flowers bloom, including at least three kinds of *Commelina*.

Lakes Shakababo and Kongolola, near Tarasaa, are a pair of oxbow lakes by the side of the Tana, teeming with mussels, fish, birds and hippos. When the river floods it spills water and rich alluvial mud into the lakes. As the river level falls the inflow stops and the lakes slowly recede. When the lake recedes the local people plant rice in the shallow water. As the water continues to drop they harvest the rice, plant maize, sweet potatoes, beans, cassava and tomatoes on the dry mud and plant rice further down the receding lake. This use continues until the river floods again. In December 1992, the waters of Shakababo are teeming with lake life, while Kongolola is wholly under cultivation.

The main road goes north to Garsen and Hola, and at Mnjila, seven km south of Garsen, a tarmac road going east to Lamu suddenly appears. A bridge spans the Tana at the village of Idsowe. It is like culture shock after the *Acacia* bushland. Noble Borassus palms dominate the skyline, and neem, mango and banana trees crowd the river banks. The YWCA runs a youth hostel, restaurant and convention centre. The Tana and Athi River Development Authority is planning a large rice scheme; an impressive head office has been built among the borasus palms, and workers are busy erecting big, comfortable staff housing.

In the past there was a large heronry near Idsowe. According to the late Myles North, a variety of waterbirds, including eight species of heron, nested in the henna trees in flooded grassland on the west bank of the Tana. The birds have since moved to a new site south of Idsowe, but in 1992, the fifth year of drought, it was not active.

Soon the tarmac road becomes a division between two worlds: north of the road the land is blue and green with standing water and leafy shrubs. Children splash and shout in the muddy water, and white egrets land among clumps of reeds. South of the road the land is dry, with white cattle walking on dusty paths among acacia bushes. The pastoralist Orma people have built a settlement there, tall egg-shaped two-storied houses of woven poles and palm tatching.

The road passes over a channel and two dikes built for the rice scheme, but after that it has no culverts. It separates a forest-grassland mosaic of great diversity into two parts. Trees on the North side are dead or dying, presumably flooded. On the south side the forest is apparently thriving, although presumably deprived of some normal water overflow. The forest canopy is low, but inside it is very dense—ground cover, shrubs, trees, lianes and epiphytes in riotous variety.

The forest-grassland mosaic slowly changes to wooded grassland, mostly acacias. Two sand quarries have become small new

lakes on the north side. The lakes are thick with freshwater mussels, fish, hippos and crocodiles.

The tarmac ends, but a good all-weather road proceeds to Lamu. Imperceptibly again the landscape changes and becomes a wet savanna: tall grasslands dotted with palms. There are two kinds of Doum Palms here, *Hyphaene compressa* and *H. coriacea.* The coastal species, *H. coriacea,* looks like a real tree, with a trunk, branches, and a rounded canopy. Around Witu and Kipini the palms dominate the landscape, with a scattering of other trees and shrubs. The soil is sandy, the grasses lush and green.

The palm grasslands and acacia grasslands are interrupted by small floodplains of grass and sedge, sometimes with open water. The flooded grasslands are full of snails—round snails as big as oranges, tiny turreted snails, and sometimes, flat spiral snails—and full of birds—openbill storks, spurwing geese, herons, egrets, spurwing plovers.

A sandy road turns north to Lake Mnuji. The people say it derives its water from springs to north, not from the Tana system a few kilometres away. The little lake, nestled below Kipini Secondary School, is a gem, sparkling blue with floating bands of vivid green Nile cabbage and water lilies and banks of thick reeds.

Plantations of coconuts, mangoes and cashewnut lead to the little town of Kipini at the mouth of the Tana River. Kipini was once an important port and administrative centre, but has fallen into genteel decline. A lighthouse and small town remain.

Past the town, the great river rolls red with soil between banks of mangroves—real mangrove forests growing thick and straight and forming a closed canopy. Some of the mangroves are 30 to 40 cm in diameter, real trees! Below the mangroves there is only mud, crabs and new mangroves. Tiny mosquitoes swarm in the mangrove forests, food for flycatchers. The harvest here appears sustainable—no clear cutting is done, there is good regeneration, and many stumps re-sprout.

It is a land where fresh and salt water mingle, where fishermen land catfish and sharks on the same beach. Full of silty runoff, some of its floodplain and channels cut off, the river runs red into the blue sea. At its mouth it deposits rich clay, some of it packed in neat red-brown rolls, elsewhere forming clayey sheets on the banks. The mud laid by the river forms a barrier to the sea, which then deposits sand. The river mouth is thus extending into the sea, sometimes mud and mangroves, sometimes sand and dunes. At high tide the sea rolls back the red flood, and then rice farmers along the river let the river flood their riparian rice fields by natural irrigation.

A wide sandy beach lies to the northeast of Kipini, ending in a natural jetty of oyster-encrusted rocks, followed by cliffs eroded by the sea. On the horizon a refrigeration ship, blazing with lights, anchors at the fishermen's rocks and takes in the harvest of the sea. Inland there are a number of archaeological sites, containing stone houses and mosques like the ruins at Gedi. Past the ruins is Nairobi Ranch, full of game and cattle. Further north, on the way to Lamu, is the Witu forest, and then Lake Kenyatta and its settlement scheme.

The Delta itself lies cradled between the river and the sea, southwest of the river mouth. It includes coral reefs, beaches, sand dunes, mangrove forests, marshes and swamps, bush and wooded grassland. The dunes are covered with their own peculiar vegetation, forming real forests in the valleys, rich in unique plants. Few people live in the Delta, mainly in the rice scheme at Ozi, but other people use it to graze their cattle in times of drought, to fish along its shores, and more recently, to take tourists to see birds, wildlife and unspoiled beaches.

THE PEOPLE

Life in Tana River District today revolves around "the bandits", armed from the conflict in Somalia. Visitors to Witu count the bullet holes in the buildings. Lamu buses have armed guards. But life goes on, adjusted to cope with the least loss of life and property. Shops close in mid-afternoon, and cars traveling at night are advised not to use their headlights, which make them an easy target.

The bandits are today's concern, but they are only bit players in a much bigger drama. One has the impression that the local people, whether farmers like the Pokomo or pastoralists like the Wardei, will inevitably lose their way of life, no matter who wins the race to develop Tana River.

The land is rich and very beautiful, and there are many entries in the race to development. On a small scale, Luo and Luhya fishermen have already migrated to the lakes and beaches of Tana River to harvest the waters. The Kikuyu people settled around Lake Kenyatta work hard and draw wealth from the rich land, but what happened to those who lived there before the settlement?

Between Witu and Kipini, the land is surveyed by the German Agency for Technical Development, GTZ, so it can be "allocated" in the Witu Settlement Scheme. Does that mean title deeds for those who already live there, or allocation to others? Are the floodplains being reserved as communal watering/grazing grounds, or are they simply considered land to be parceled out?

At Lake Shakababo, I admire the harmonious way the local farmers use the receding lake waters to plant rice and other crops. Then I am told that they would like to block the Tana from flooding so they can grow one more crop. In Lake Kongolola, they farm the rich alluvial mud right down to the centre of the lake. But if the river does not replenish the water and the alluvium, what will happen in he dry season? What will happen to their crops next year?

Meanwhile, developers from Europe and Nairobi talk about the development they will bring to Tana River. The idea is to develop prosperity through a new tourist circuit—lakes thick with hippos, crocodiles and pelicans, ranches where wild game from topi to elephant roam, golden beaches and coral reefs. The developers are also thinking of modern large-scale irrigated horticulture around the lake. Naivasha prospers, yes, but it had no permanent inhabitants before the white settlers. What will happen to the "ecological" farmers of Lake Shakababo if it is turned into a modern orchard?

The agrochemical companies have not been left out of the race. Although the farmers of Lake Shakababo may seem to lead strictly traditional lives, under a palm-thatched shelter there is a spraying backpack to put the latest poison on the tomato plants.

Upriver, well-meaning government and non-government organisations preach the gospel of health centres, tree nurseries and income-generation with fervour. Those who planned the road did not take the seasonal flooding of the Tana into consideration, however; will those who are planning the rice scheme and possible sugar cane plantations consider the rich biodiversity of the riverine forests? Health services are promoted, but so are projects such as the rice scheme which will increase the two main local diseases—malaria and bilharzia—many times over.

The forest department plants shade trees on waste ground although its thorns are reputed to go right through a tractor tire. Near the TARDA headquarters, neatly-dressed young men carefully tend a plot of little trees-all fast-growing, weedy exotics, while the magnificent indigenous borassus palms do not regenerate. Did any of these projects carry out serious environmental impact assessments and consider their impact on the local culture and ecology?

For more than twenty years the Kon-Dertu Ranching company, which is owned by

Pokomo people from Tana River, has claimed the land of the Delta, between the river and the sea. For just as long, conservationists have tried to preserve the Delta for its unique plants and animals, and the role it plays in maintaining the fresh/salt water balance of the area. Who is right?

The Kon-Dertu Ranching Company want to develop cattle and game ranching and tourism in the Delta, and surely they have the most right. But Kon-Dertu immediately sold some of the land to Coastal Aquaculture who want to develop a large-scale prawn farm. Conservationists fear that the aquaculture project will fail as others have failed, and will in any case endanger the fish and prawn spawning grounds under the mangroves, damaging the habitat for all other users. (The land allocation to Coastal Aquaculture has since been canceled.)

The Delta itself is now a true delta only in the rainy season. More than a hundred years ago a canal was built that shifted the river's lower course from south to east, now entering the sea at Kipini. Much more recently farmers have dammed the Kalota Brook, one of the channels of the delta, in order to get to the other side and to ensure a sufficient overflow of fresh water to the riverbank rice. Their fresh water cut off, the fig trees are drying, the mangroves shifting, and the hippos and crocodiles are trapped. Would a simple culvert solve this specific problem?

The Kenya Wildlife Service has said that a wetland reserve would bring benefits to the people, that there will be jobs in tourism and compensation in the form of schools and health centres. The Orma, Wardei, Pokomo and Bajuni people fear that if a wetland reserve is created they will lose their dry-season grazing, their riverside irrigation farming, their source of timber and their rich fishing grounds—and some of their sovereignty.

They point out that the people of Tsavo and the Tana River Primate Reserve have not yet benefited from the Parks. They claim that KWS protects baboons who raid their crops, and does not allow the people to eat the crocodiles that sometimes kill their children. They told us "You tell us that you will bring development; well, go away and leave us to our poverty!"

Change is inevitable in Tana River, and the Orma, Wardei, Pokomo an Bajuni people are likely to lose their traditional lifeways. The time of the bandits is only a brief hiatus. What change will bring the most benefits and the least painful disruptions to the people?

Acknowledgments
This contribution includes information from Prof Steven Njuguna and the ASAL Tana River Delta Wetlands Survey, 1991, and insights from Oliver Nasirwa and Kuria Ndung'u

Fleur Ng'weno, Box 42271, Nairobi

Book review

Wetlands, edited by Max Finlayson and Michael Moser. Facts on File, Oxford and New York. ISBN 0-8160-2556-8. £21.95 from IWRB, Slimbridge, Gloucester GL2 7BX, UK. pp. 224; six maps, many colour illustrations.

This good-looking book examines a neglected set of habitats: the wetlands of the world. As threatened as tropical rain forests by the incessant demand for economic growth, these biologically rich, productive and valuable habitats have long been regarded as wastelands to be filled, drained, dyked or dammed.

As the Editors put it, *Wetlands* "represents the culmination of more than 20 years' work to document the status of the

world's major wetlands, through a programme of regional wetland directories." These detailed reference texts are not designed for the average coffee-table, and the aim of the book, produced by the International Waterfowl and Wetlands Research Bureau (IWRB), is to provide an accessible and informative account of the world's wetlands for a much wider audience.

After a chapter on "Wetlands and their values" by Edward Maltby, the major biogeographical regions are dealt with in turn, from Europe and the Mediterranean basin to Australia and Oceania, via North America, Latin America and the Caribbean, Africa, and Asia and the Middle East. Almost every page includes a full-colour photograph of some wetland inhabitant, use or threat. All are of high quality and some are stunning. A rapid skim through the pictures alone certainly brings home the sheer variety and beauty of wetland habitats.

Yet this is far from just a glossy picture book, and the text itself reads with high seriousness. Each of the regional chapters deals with geography and climate, describes the range of wetlands by sub-region or type, then examines flora and fauna, values and uses, threats, management and conservation. Boxes are used effectively to set off particular detailed examples. The last sections in each chapter tend to make depressing reading; although there are examples of wetlands sensibly managed in sustainable ways, these remain very much the exception. It seems that governments just cannot bear to leave wetlands alone. Despite the sad file of past case histories, wetland after wetland is threatened today by grand projects that will irretrievably alter their ecology: usually at a heavy price in terms of local communities and ways of life, hydrological systems and biodiversity. The book makes clear that wetland management for sustained production is both possible and desirable—but only with a fundamental change in attitude amongst both the donors and recipients of development aid.

In trying to tackle the wetlands of the entire world in just over 200 pages the editors and contributors have a considerable task; and the strain sometimes shows. The difficult balance between oversimplification and suffocating the reader with detail is not always obtained. Maltby's introductory chapter is particularly unsatisfactory at times. It contains some fascinating details (did *you* know that the North American Swamp Rabbit hides from predators by remaining submerged with only the tip of its nose exposed?) but these fail to add up into a coherent account of wetland ecology. Patrick Denny's chapter on Africa manages the tight-rope act with more success. This is an excellent account of the continent's wetlands and the sections on threats, management and conservation should be required reading for informed conservationists—and decision-makers.

IWRB has a well-deserved reputation as a scientific authority on wetlands (it is the scientific adviser to the Ramsar Convention on Wetlands of International Importance, which receives a good deal of attention in the book). The authors' access to up-to-the minute data is evident: for instance, a box on Nakuru and Naivasha quotes the results of recent waterbird counts, carried out as it happens by EANHS members. It is thus disappointing that the book's excellent finish hides some sloppy inattention to detail. The regional maps, as well as being difficult to interpret (lots of green ink sloshed around in a rather slapdash way), are inaccurate; on the African map, for example, Lake Turkana is labeled as Lake Naivasha and the Nyumba ya Mungu reservoir in Tanzania is in completely the wrong place. Scientific names are frequently misspelled or inconsistent (for instance, the Yellow-billed Stork appears as both *Ibis Ibis* [sic] and *Mycteria ibis* within the same chapter), and there are simple errors of fact: the "largest breeding colonies of flamingos in Africa" have occurred on Lake Natron, not the Makgadikgadi Saltpan; the

Yellow Swamp Warbler (or Papyrus Yellow Warbler) is not "found only around Lake George in western Uganda" but in a number of other papyrus swamps in Uganda and Kenya.

These sorts of errors would hardly matter in an ordinary coffee-table book; but they jar in a text boasting itself as "authoritative". Nonetheless, there are many things I will refer to in this text (the index is excellent); and I can certainly recommend it to any natural historian with the remotest interest in getting his or her feet wet—even vicariously.

Leon Bennun, Ornithology Department, NMK, Box 40658, Nairobi

Requests for information

Birds and crocodiles is a most fascinating subject; I am always on the look-out for possible associations and have photographed Green-backed Heron, Yellow-billed Stork and Spur-winged Plover near crocodiles. It was Herodotus, who first described a unique association: the Egyptian Plover, it was said, would pick bits of food from the teeth of a basking crocodile.

It is possible that it could have occurred centuries ago, but much has changed since the time of Herodotus, when crocodiles were more numerous and riverine habitat was largely undisturbed.

As far as I know, no present day naturalist, let alone photographer, has been able to confirm or record this behaviour. Although several authors I have come across mention "crocodile bird", some calling it a Tickbird or Egret, in fact rely on imagination rather than facts.

It would be interesting if any bird-watcher/naturalist is able to confirm or comment on the crocodile-bird association.

Frants Hartmann, Box 30181, Nairobi

Our Chairman, Dr Leon Bennun, who is also Head of the Ornithology Department at the NMK, communicates the following:

The Egyptian Plover (*Pluvianus aegyptius*, Family Glavedidae)—actually a courser!—is also called Egyptian Courser and Crocodile Bird, the latter name because of Herodotus' famous observation. This behaviour has never been confirmed.

The following is quoted from *Birds of Africa*:

Contention that the Egyptian Plover picks food from gaping jaws of crocodiles dates back to Herodotus' visit to Egypt in 459 B.C. (his account probably, but not certainly, refers to *Pluvianus*). Brehm in his 19th century work 'Tierleben', romanticised the *Pluvianus*-crocodile association and stated that he had seen jaw-picking many times; Meinertzhagen (1959) described jaw-picking by *Pluvianus* (observation undated) and Spur-winged Plover *Vanellus armatus* (in 1907). Both authors apparently relied on memory of times long past; no other naturalists have ever reported seeing jaw-picking.

Society News

Journal Vol **81** (201), "A check-list and Identification Key for Succulent Plants in General Cultivation in Nairobi", by L.E. Newton and P.K. Mbugua, is available from the EANHS office. There is one more Journal part planned; after this we will start with the new-style *Journal of East African Natural History*.

Obituary

WILLICE ODHIAMBO OCHIAGO (1962-1993)

Willice Odhiambo Ochiago was beaten to death by thugs in Ngong in July in one of the hundreds of acts of murderous violence each year that neither make the newspapers nor lead to beefed up security in sensitive areas nor cause international concern. An apparently ordinary Kenyan, Ochiago had unusual interests. After a two year spell as a teacher at Sawagongo High School in Kisumu and Burhaniya Secondary School in Mombasa, he joined the Zoology Department of the University of Nairobi as an undergraduate student in 1983. Always receptive to biological ideas, he attracted the attention of Thelma Rowell who recruited him into her research programme at Kakamega Forest where for three months he studied interactions between different troops of blue monkeys. This work was written up in his undergraduate dissertation and helped to earn him a good honours degree in zoology in 1986. Under Thelma's guidance he learned many of the field techniques that he was later to employ in the Tana River Primate Reserve, and like many other students before him he was provoked by Thelma into thinking hard about why monkeys live the way they do.

His experience at Kakemega made him a natural recruit to the MSc Biology of Conservation programme at Nairobi University. He comfortably passed his first year examinations and was subsequently sponsored by the Institute of Primate Research to study the Tana River Red Colobus. Concern about this endangered subspecies had grown following Clive Marsh's resurvey of its population in the Tana forests. Ochiago spent nine months in the reserve conducting a thorough survey of the population. He censused the monkeys throughout their 52 km geographical range and determined the demographic composition of 16 groups in detail. When the camp was closed for security reasons he remained behind to continue with the work.

Ochiago was not altogether happy in the field, but he treated the hazards and discomforts of life in the bush with good humour, always preserving the ability to laugh at himself and the situations in which he landed. In a 1990 article in the Bulletin on Life in the Tana River Reserve, he described a day of encounters with mosquitoes, tsetse flies, a buffalo, a stinging shrub, safari ants, falling branches, a hippopotamus, poachers, and mud, ending up with a burnt meal back at the camp. In an area fraught with misunderstanding between the wildlife authorities and the local community, he was able to build good relationships with the Pokomo villagers.

As a scientist, Ochiago was still maturing. He loved to apply theoretical ideas to his data and tended to look at the conclusions he got from them as though they were written in diamonds. As his supervisor, I had to struggle hard to restrain his enthusiasm for the latest population genetic model he came across, and I almost came to wish that Michael Soule's book on Viable Populations for Conservation had never been written. But if this was a weakness in Ochiago, it was a welcome one in a world where all too many students present their results as though they were counting the number of grains of sand on a beach. It is all the sadder that he never had the chance to hone his critical faculties in the rigour of doctoral research.

The EANHS joins his family and friends in mourning his loss.

Ian Gordon, Box 57, Kilifi

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The Society publishes, in collaboration with the National Museums of Kenya, the Journal of East Africa Natural History. The Journal is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Secretary, P.O. Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

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This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), P.O. Box 44486, Nairobi, Kenya. Line drawings can be published. Photographs will be considered if they are essential to the article.

SCOPUS:
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Articles and Notes

TREE HYRAX IN THE MAU

A brief study was carried out in South West Mau region of the Mau Forest complex in March 1993. The primary aim was to assess the importance of the Tree Hyrax, *Dendrohyrax arboreus,* to the local forest-dwelling people as a source of food and medicine and in their spiritual traditions, while investigating the effect of the human exploitation on hyrax population size. Interviewing the predominantly Okiek hunters also provided an opportunity to learn something of the ecology of this poorly understood mammal.

Study area & methods

Mau Forest, in Rift Valley Province, is the largest remaining area of close canopy forest in Kenya (Figure 1). Within South West Mau there is a range of forest types from moist montane forest to open canopy scrub and grassland. *Tabernaemontana stapifiana* and *Neoboutonia macrocalyx* dominate in the west while in the east there is *Macaranga* scrub grassland with isolated patches of *Podocarpus latifolius/Schefflera* spp forest. Bamboo occurs throughout the forest, especially from the centre eastwards. There is a gradient of increasing altitude from west to east and a corresponding change in climate from warmer wetter weather in the west to cooler, drier weather in the east.

Mau Forest is one of the forests for which management plans are currently being drawn up by the ODA funded Kenya Indigenous Forest Conservation Project (KIFCON).

A rough estimate of the hyrax population was made by surveying the forest in five areas between Ndoinet Forest Station in the east and Monges in the west (Figure 2). As yet, there is no well established method for censusing Tree Hyrax but hollow trees, especially *Podocarpus latifolius, Schefflera volkensii* and *Juniperus procera,* showing signs of hyrax inhabitation such as latrines or hairs caught on the bark, could be used as an indirect survey method (Kundaeli, 1976a). Densities were estimated by walking transects of known length and estimated width through the forest. The minimum number of hyrax per hectare was calculated from the number of trees found with positive signs of hyrax presence, assuming each individual lived alone (Kundaeli, 1976a). These values were unrealistically low compared with the amount of nocturnal vocalisation heard, suggesting that many inhabited trees were undetected. An upper limit was therefore estimated by counting the total number of suitably sized trees with cavities.

Hyrax density

It was found that hyrax density was greatest in the forest/bamboo habitat on the eastern side of Mau where the forest was drier and had a higher representation of trees suitable for hyrax (Table 1). However, forest on that side tended to only remain in small isolated

Figure 1: Map of Kenya, showing approximate location of Mau forest

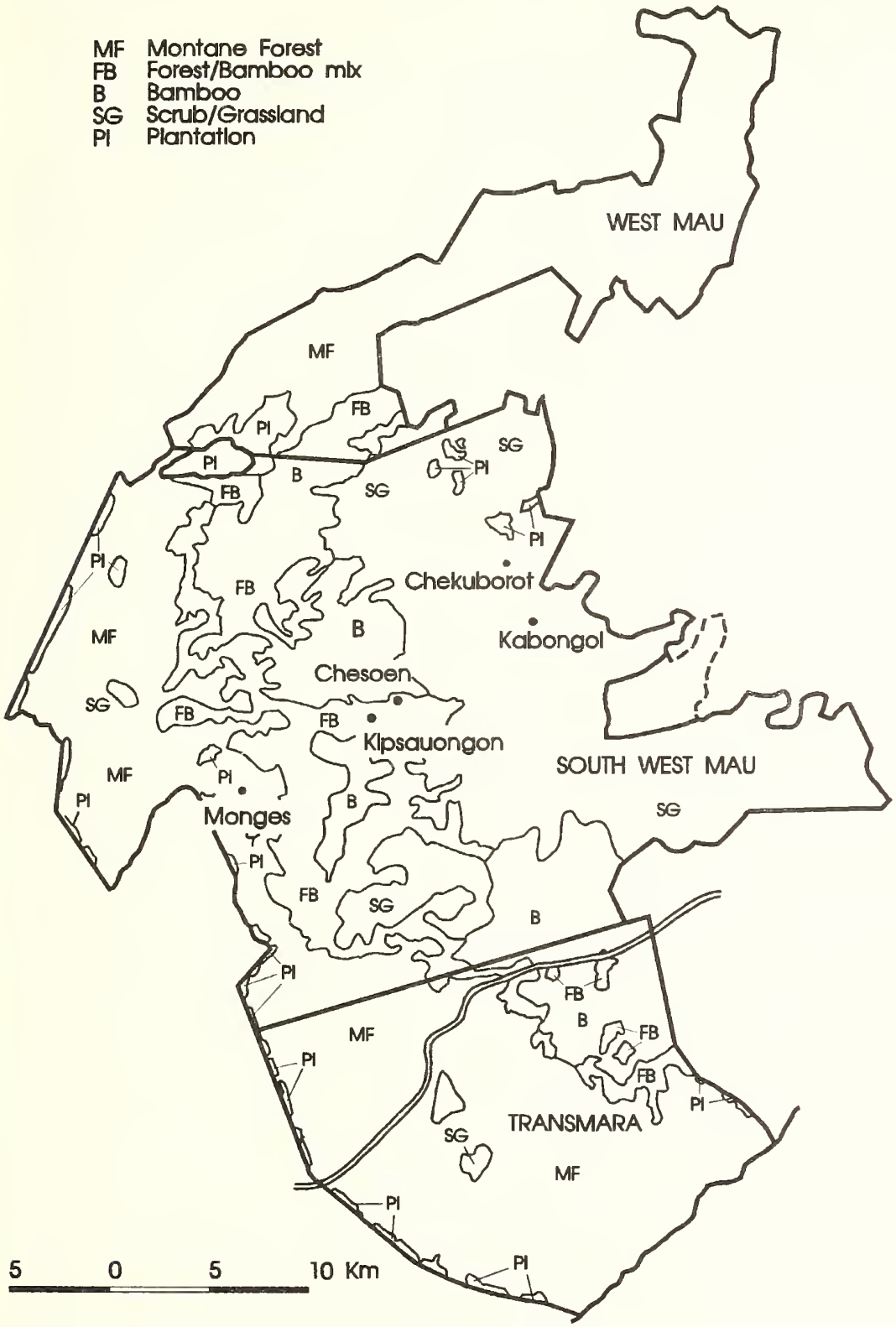

Figure 2: Map showing locations of survey sites in South-West Mau

Table 1. Densities of Tree Hyrax in each area

	Area surveyed	No of Hyrax/ha	
		Min	Max
Chekuborot	1.5	1.4	11
Kabongoi	1.1	2.3	15
Kips/Chesn	1.6	1.2	14
Monges	1.2	0	2.5
Average density	7.5 1.3	forest/bamboo mix montane forest	

patches amongst bush and grassland scrub. Densities were low compared with the 13 to 70 *Dendrohyrax validus* found per hectare on Mt Kilimanjaro (Kundaeli, 1976b).

Hyrax hunting

A total of 40 men from different age groups, clans and regions of Mau were interviewed about their frequency of hunting, target species and uses of hyrax. Only 16 claimed to be frequent, practicing hunters and of those, only 1/4 ever made hunting trips specifically for hyrax. These men tended to be particularly fond of the sweet meat of hyrax or required hyrax for medicinal purposes. Others only would kill hyrax if it was encountered whilst on a hunting trip for antelope.

The most widely recognised method of catching hyrax was to climb its tree and insert a stick into the cavity. This would then be rattled around inside until the hyrax lost its footing was knocked down to the ground, where dogs or a fellow hunter with panga would be ready and waiting.

Uses of Hyrax

In the past, hyrax meat was undoubtedly of great importance in supplementing the diet. Now, with a decline in interest in hunting and shift in life-style to cultivation and stock-keeping, it is of less importance. Furthermore, several men would no longer eat hyrax meat for religious reasons. Of those who ate it, many did so only rarely.

The use of hyrax skins was still important for clothes for initiation ceremonies but because skins may be stored for some years and borrowed from or lent to relatives, this use no longer warranted specific hunting trips.

Traditional medicine is still widely practiced in Mau, both as a means of prevention and cure of a number of ailments. The principal medicinal use of tree hyrax was to cure deep coughing, especially in children, by drinking the ash of its burnt fur mixed with water or honey. Coughing in cattle could also be cured by mixing the dried stock contents of hyrax with animal feed. The plant material in hyrax stomachs was used as a herbal remedy in people too, believed to ease aching ribs or, if burnt, to heal wounds. The only previously recorded medicinal use of hyrax was a substance sold as 'dassiepiss' in South Africa which is collected from communal urinals of rock hyrax. This is said to cure kidney and bladder complaints (Kingdon, 1971).

Table 2: Percentage of men interviewed using hyrax in each of five ways

Use	%
Meat	69
Skin	62
Medicine	62
Ritual	28
None	13

The hyrax featured prominently in the folklore and beliefs of the Okiek. For example, a hyrax heard screaming during the day was considered a terrible omen and a child's birth may be blessed with the ritual use of a hyrax skin.

Tree Hyrax Ecology

The Tree Hyrax has never yet been studied in the wild. Considerable work has been done on the closely related Rock and Bush Hyrax, *Procavia* spp and *Heterohyrax* spp (collected in Maloiy & Eley, 1992), but important differences in ecology and behaviour exist between these and *Dendrohyrax*. This study was not sufficiently in depth to answer many of the mysteries about the life of the Tree Hyrax. Whether or not Tree Hyrax are nocturnal is still an issue of some debate (Rudnai, 1984). Most men interviewed held the belief that hyraxes were nocturnal because they were heard calling at night, yet over 90% of them had seen hyrax, usually inactive, basking in the morning or late afternoon sun.

A number of men had witnessed hyraxes fighting and this evidence together with hyrax calling behaviour suggests that they are territorial (also suggested by Kingdon, 1971). It was generally agreed that hyrax called seasonally, although how these seasons related to those of the weather was unclear. It was also established that the phase of the moon had no influence on calling behaviour. The size of a social group within a territory was unknown. Many men believed it to comprise of a pair and their offspring but there was little evidence to support this. Litter size was believed to be one—or occasionally two—young, as also reported by O'Donoghue (1963). Neither the inter-birth period nor the breeding season were known by any of the men interviewed.

A list of some 25 species of food plants was named by interviewees which included leaves and fruits of trees, shrubs, creepers, epiphytes and some herbs. The only known predator of hyrax (other than man and dogs) was the 'eagle'—probably the Crowned Eagle and possibly Ayre's Hawk Eagle.

Despite the uncertainties in Tree Hyrax breeding behaviour, if it can be assumed that each pair, on average, produces one offspring per year, then the rate of human exploitation in Mau was less than 1/4 of the annual hyrax population increment. As such the Tree Hyrax is not considered threatened by hunting pressure. However, the forest is becoming increasingly degraded, especially in the east where there is heavy settlement and it is the loss of large trees in which hyrax can live that is more likely to limit population growth.

Acknowledgments

Many thanks to Dr Glyn Davies of KIFCON Biodiversity Studies for initiating the study and logistical help. Also to John Mutai of Chekuborot for his hard work as my guide and translator.

A full report of this study has been submitted for publication to the Journal of East African Natural History.

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PRELIMINARY NOTES ON *SYZYGIUM* (MYRTACEAE) AT MUFINDI, TANZANIA

A number of habitats are found in Mufindi District (Iringa Region, southern Tanzania). Moist montane forest grows on the east facing escarpment of the southern Udzungwa Mountains (Lovett & Congdon, 1989), grading into tree clumps in grassland to the west. Further west are extensive areas of swamp and seasonally inundated grassland, with *Brachystegia* woodland on well drained ground and fringing forest along watercourses. Five taxa of *Syzygium* Gaertn. (Myrtaceae) are known to occur in the area. The busy tree *Syzygium cordatum* Hochst. forms almost monospecific stands in marshy land and also grows in fringing forest immediately next to water. The small tree *Syzygium guineense* (Willd.) DC. ssp *guineense* occurs in woodland adjacent to fringing forest, and has been observed flowering simultaneously with *S. cordatum* on the Ndembera River (elevation 1,560 m; 8° 14' S, 35° 07' E) in October (*S. guineense* ssp *guineense*, Lovett 942; *S. cordatum*, Lovett 948). The suffrutex *S. guineense* ssp *huillense* (Hiern) F. White occurs on the edges of seasonally inundated grassland at Ngwazi (elevation 1,830 m; 8° 35' S, 35° 15' E) amongst small termite mounds, flowering in November (Lovett 2391) and fruiting in January (Lovett 2965). The tall forest tree *S. guineense* ssp *afromontanum* F. White occurs in moist montane forest and in tree clumps on termite mounds in grassland. At Lugoda (elevation 1,940 m; 8° 35' S, 35° 15' E) it has been observed flowering simultaneously in April with a tree that keys to *S. masukuense* (Baker) R.E. Fr. ssp *masukuense* in White and Kupicha (1978) (*S. guineense* ssp *afromontanum*, Lovett 283; *S. masukuense* ssp *masukuense*, Lovett 282). *S. masukuense* ssp *masukuense* also occurs as a canopy tree in the Mufindi moist montane forest (Lovett, 1989), with a second subspecies, *S. masukuense* ssp *pachyphyllum* F. White, in Zimbabwe, Malawi and Mozambique.

Syzygium guineense and *S. cordatum* are thought to hybridise extensively in southern and eastern Africa (Dale & Greenway, 1961; Dowsett-Lemaire, 1989; Coates Palgravae, 1983; White, 1963) and White and Kupicha (1978) suggested that *S. masukuense* ssp *masukuense* may be of hybrid origin because it is only found where both *S. guineense* ssp *afromontanum* and *S. cordatum* occur in close proximity. This is true at Lugoda on Mufindi golf course (rainfall 1,200 mm/year, dry season 26–28 weeks), where both *S. guineense* ssp *afromontanum* and *S. masukuense* ssp *masukuense* occur in tree clumps and *S. cordatum* grows in waterlogged valleys less than half a kilometre away. The golf course tree clumps were originally in grassland but Black Wattle (*Acacia mearnsii* De Wild.) and Australian Blackwood (*Acacia melanoxylon* R. Br.) were planted as breaks around the course. Both *Syzygium guineense* ssp *afromontanum* and *S. masukuense* ssp *masukuense* have regenerated along the edges of the breaks in rich organic soil created by the wattle. The regeneration is up to 2 m tall and 10–15 years old; all leaves of the regeneration were growing under similar light conditions. Variation in leaf shape and petiole length was observed in the golf course *Syzygium,* possibly indicating the presence of a hybrid swarm.

To test this hypothesis, ten leaves from each of the mature *Syzygium* trees in tree clumps and the regenerating *Syzygium* trees at the edges of the second to eighth fairways were sampled. Leaves from the mature trees were taken from the lower edge of the

canopy about 2 m from the ground and leaves from regenerating trees were taken from the upper part of the sapling. Petiole length, leaf lamina length, maximum leaf width, presence or absence of a cordate leaf base, and presence or absence of square stems were recorded. A sample mean of leaf width/length ratio was calculated and plotted against the sample mean of petiole length for each individual. Three symbols were used to plot leaf measurements from the 49 mature trees and 95 regenerating trees sampled (total of 1,440 leaves) to show fully cordate leaf bases, fully cuneate leaf bases and weakly cordate, rounded leaf bases. A fourth symbol was used to show leaf measurements from 20 mature trees (200 leaves) sampled from the adjacent *S. cordatum* population for comparison. The results are shown in Figure 2; drawings of examples of different leaf variants are shown in Figure 1. The numbers of individuals with square stems, round stems and different types of leaf bases are shown in Table 1. All individuals of *Syzygium cordatum* have square, winged stems and cordate amplexicaul leaf bases. In golf course *Syzygium* square stems were significantly associated with cordate leaf bases, though square stems did occur on some individuals with cuneate leaf bases.

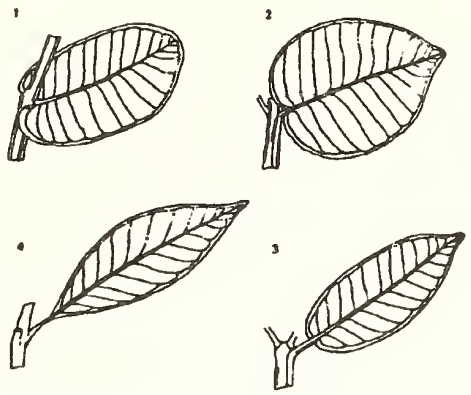

Figure 1: Illustrations of an example of each leaf type. 1. Syzygium cordatum. 2. Golf course Syzygium with cordate leaf bases (S. masukuense ssp masukuense). 3. Golf course Syzygium with partially cordate leaf bases. 4. Golf course Syzygium with cuneate leaf bases. (S. guineense ssp. afromontanum).

White and Kupicha (1978) clearly separate *Syzygium cordatum* from *S. guineense* and *S. masukuense* on floral, fruit, and leaf characters. The stamens of *S. cordatum* are longer, as are the calyx and upper receptacle, and the fruit is urceolate rather than ellipsoid or subglobose. The leaves are subsessile, deeply cordate and amplexicaul, and the stems are square and winged. In Mufindi it is a distinct, easily

Table 1: Numbers of individuals of golf course Syzygium and Syzygium cordatum with different leaf base shapes; and numbers of that total with square stems in regeneration and mature trees.

	Leaf base shape		
	Cuneate	Intermediate	Cordate
Regeneration			
Square stems	8	13	15
Round stems	34	23	2
Mature trees			
Square stems	2	5	3
Round stems	32	3	4
S. cordatum			
Square stems	0	0	20
Round stems	0	0	0

recognised species occupying a well defined habitat. White and Kupicha (1978) separated *S. masukuense* from *S. guineense* by leaves that are subcordate or broadly rounded rather than being cuneate at the base. In Figure 1 and Table 1 *S. cordatum* can be seen to be distinct on the basis of short petioles, broad leaves, and square stems. *S. masukuense* ssp *masukuense* can be separated from *S. guineense* ssp *afromontanum* on the basis of shorter petioles, broader leaves and cordate

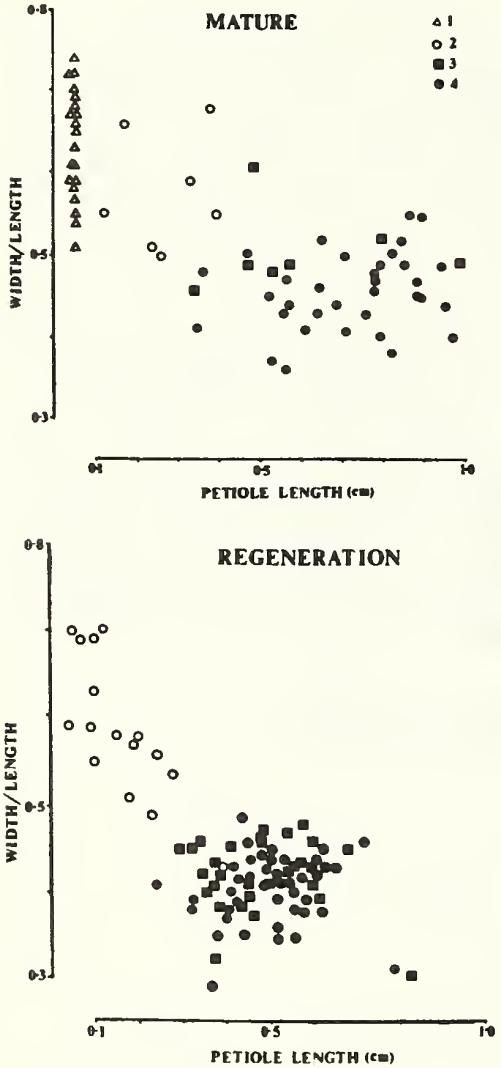

Figure 2: Graph of sample mean of leaf lamina width/length ratio and petiole length of 10 leaves from each individual of mature trees and regeneration of golf course Syzygium and Syzygium cordatum. Numbers as in Figure 1

leaf bases. However, they are connected by a range of intermediates. Thus, on the basis of leaf shape, petiole length and stem shape, the results suggest that a hybrid swarm does indeed exist.

The trees on the golf course are a mixture of moist forest, forest edge, and non-forest species. For example *Aphloia theiformis* (Vahl) Benn., *Cassipourea gummiflua* Tul., and *Garcinia kingaensis* Engl. are moist forest trees. *Euclea divinorum* Hiern and *Tecoma nyassae* Oliv. are forest edge species; and *Erythrina abyssinica* Lam. is a woodland tree. This mixture of species suggests that the tree clumps are a transition between moist montane forest and woodland. The presence of the adjacent waterlogged valley with *Syzygium cordatum* further adds to the transitional nature of the vegetation. The occurrence of *Syzygium masukuense* in closed montane forest east of the tree clumps, and presence of the hybrid swarm at the forest-woodland ecotone, suggest that *S. masukuense* has arisen by hybridisation between the forest tree *S. guineense* ssp *afromontanum* and the non-forest *S. cordatum,* and has subsequently entered the moist montane forest environment. Hybridisation has also been suggested as a mode of speciation in *Impatiens* L. in Tanzania (Grey-Wilson, 1980), *Erythrina* L. in Mexico (Neill, 1988) and *Streptocarpus* Lindl. in Natal (Hilliard & Burtt, 1971).

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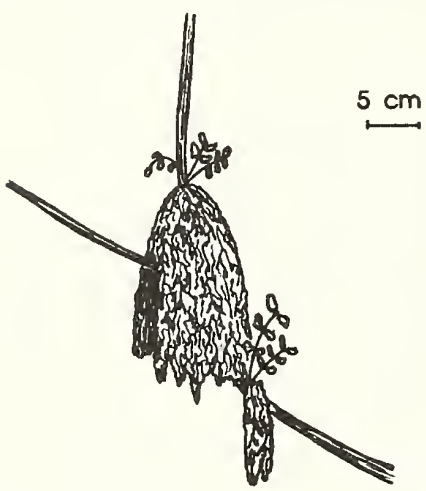
BWINDI BIRD INTENT ON SLEEP

On a recent study tour of south-western Uganda, a team from the National Museums of Kenya had the pleasure of a two-day field visit to the Bwindi-Impenetrable National park (333 km²). This Park is becoming well-known for the habituated Mountain Gorilla groups in the Buhoma area which have been viewed by tourists since April this year. However there are many other natural history treasures in its steep valleys, dense ground vegetation (*Mimulopsis* and *Sterculia*) and towering forests.

In addition to the gorillas (there are about 280 gorillas which account for just under half the world's population), there are 150–250 chimpanzees, golden cats (occurring in melanic morphs) and about 25 elephants (Butynski, 1984). Other primates include the red-tailed monkeys at lower elevations, and semi-terrestrial L'Hoests monkeys, blue monkeys (with blue-black limbs and ash-grey bodies), black-and-white colobus, potto and both Demidov's and Matschie's galagos all in the vicinity of the Ruhiza area on the north-eastern flank of Park. This is the site (2,300 m altitude) of the Institute of Tropical Forest Conservation, a faculty of Mbarara University.

On a short tour it was the birds which were easiest to look at, and the avifaunal richness of this forest has already been reported (Butynski and Kalina, 1993). We were greeted on the first morning by a pair of Ruwenzori *Batis* flycatchers feeding a darkheaded juvenile, and went on to see another eight birds endemic to the region in a three-hour walk in "bird valley". Such was the wealth of bird life and relatively good viewing conditions. Anyone interested in ornithological research should contact the Institute as there is plenty to discover.

For example at 18:45 hrs on 18th August. a Stripe-breasted Tit landed on a lower limb of a small (about 10 m tall) *Hagenia* tree, of which there are several on the edge of clearings around the Institute. The bird was alone and flew up to disappear into a clump of dead *Hagenia* leaves. In characteristic fashion the dead leaves had not fallen, but accumulated in a rust-coloured bunch (probably including flower/fruit stalks) which overhung a branch with small side-branch. Investigation with torch revealed the bird sitting under the tent of dry leaves, perched on the side-branch. The following evening at 19:10 hrs the bird flew into the *Hagenia* tree while two mountain white-eyes flew into another tree. The bird was on the roost before 19:19 the next evening and left between 07:00 and 07:30 the following morning.



On 21st August, it rained all afternoon until sunset and the bird was already on its perch by 18:45, where it looked comfortable and dry. Indeed it is not difficult to guess why a warm, dry roosting site was selected at this high altitude, presumably by the same bird, for the four consecutive nights the roost was observed. It is reminiscent of European wrens roosting communally in summer nests to keep warm in winter, and poses the question: What roosting behaviour helps tiny birds avoid hypothermia in the cold, damp montane forests of East Africa? A question that could be investigated by following birds to their rooting sites in the early evening, unfortunately just when sun-downers and supper preparation are distracting us!

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CHESTNUT WEAVERS IN NAIROBI GARDEN

It was about the middle of October (1993) when I started to notice that among the birds in my garden—on the 'Hill' in Nairobi, just above the Nyayo Stadium—there were new-comers. For the first few days I did not have a good look at them, they looked to me like some sparrows, but when they started to come on the tray in front of my window, there was no doubt: these birds were Chestnut Weavers (*Ploceus rubiginosus*) in their non breeding plumage! Soon I had about 40 sitting in the peppertree (*Schinus molle*) opposite my desk waiting for seeds.

They only took millet from the tray fighting off the grossbeak weavers (*Amblyospiza albifrons*), who only take sunflower seeds, and the Baglafect's weavers (*P. baglafecht*) who feed on sunflower seeds

but take millet to feed the young. On one day in late October, there was among the flock a single male in almost complete breeding dress.

Thinking that I may have made a discovery, I perused all the books I posses and indeed chestnut weavers are not supposed to occur in Nairobi. But then I found in Lewis and Pomeroy's *A Bird Atlas of Kenya* that during the 1984 drought chestnut weavers were seen in Nairobi gardens...

We had our first rain of the season on the 30th of October, followed by a few rainy days. The chestnut weavers stayed. Then we had no rain for about two weeks and I saw many chestnut weavers in the neighbourhood, flocks and flocks of them.

Then, to my astonishment, I saw a pair, in non breeding plumage, build a nest: in front of my nose, less than 20 feet away. They built a nest, a nest precisely according to the books: retort shaped, untidy and not woven entirely of grasses but also of leaves and stems. The pair spent a week cavorting and courting and displaying about the nest and then they seem to have lost interest.

On the 15th of November all the Chestnut Weavers left but one. This individual sat here most of the time on the same bow and chirped and chirped desperately all the time.

On the 19th of November my flock returned, they were the same birds as before because they immediately reoccupied the seed tray.

On the 20th of November, the rain started in more earnest. By the 22nd the large flock had left again this time two birds remaining, until the 25th of November there was no Chestnut Weaver on my garden or, for that matter, on the Hill yet on the 28th there were two stragglers and then, presumably because it started to rain more in earnest throughout the country, the Chestnut Weavers have really left.

Imre J.P. Loefler, Box 47964, Nairobi

A NOTE ON SOME BIRDS SEEN IN KORDOFAN AND DAFUR STATES, SUDAN, DURING AUGUST AND OCTOBER 1993

While undertaking survey work during the current Desert Locust upsurge in central Sudan, Kordofan State, in August 1993, I was able to observe the apparent migration of quite large numbers of raptors. Stretching through a large area of scattered Acacia bush usually in ones or occasionally twos were grasshopper buzzards. A curious raptor, which reminded me of a brown coloured goshawk in stature, they were often to be seen sitting on the ground, although some were in the shade of low Acacia trees. They were widely spaced out, and did not take flight immediately when we slowed to look at them. Although I did not make any counts there must have been hundreds of them spread throughout a wide area of very dry desert country. There was an unconfirmed report that three raptors had been killed as a result of control operations against locust hoppers, but I did not see them.

In El Obeid (Central Kordofan) in the town and in neighbouring small villages, Abdim's storks were nesting. In most cases the young were almost ready to fledge. I noticed in the literature when I returned to the UK, that there is little data on the development of the young of this species.

Near El Koketi (14° 16' N, 29° 50' E) salt wells, just before dusk I saw at least 100 black kites (yellow-billed) sitting in the trees and on the ground. I have never seen such a large concentration in one place. They were also well dispersed throughout a large area and seemed to be concentrated near settlements. A further 30 were counted near

Um Kredim (13° 33' N, 29° 54' E).

Swallow-tailed kites were seen over quite a large area to the east of Shatib (14° 00' N, 31° 03' E), flying typically in small groups. On one occasion, 27 were seen together.

Vultures were noticeable by their absence, I saw one group of nine possibly white-backed vultures sitting on the road-side between El Mazrub (13° 57' N, 29° 15' E) and Abu Jebil (14° 12' N, 27° 07' E). I could not be sure, as I had no field glasses with me.

In the west of Sudan (Dafur State), in El Fasher, Abdim's storks, black-necked herons (13 nests in one tree) and sacred ibis were all nesting amid the bustling town market place.

At the end of October 1993, I was back again in Sudan, and during my first week in Karthoum I was happy to see a small flock of European bee-eaters flying south one evening, and a few days later a bat hawk was seen carrying a bat as it passed my hotel. The curious rather shallow flight and falcon-like wings were obvious. I have not seen it since.

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MAMMALS OF EAST AFRICA: PRELIMINARY STATISTICS

The *Checklist of East African Mammals,* an initiative of members of our society from Tanzania, Kenya and Uganda, has recently been completed, and will be published very soon. Details are given elsewhere in this issue of the *Bulletin.* The information contained in the Checklist allows us to calculate a few simple statistics, and make a comparison of mammal biodiversity between the three countries. As shown in Table 1, there is a total of 512 mammal species in East Africa. Of these, 202 occur in the three countries (column labeled KUT). Other columns in Table 1 show the number of species that occur in only one of the countries, and in each pair of countries.

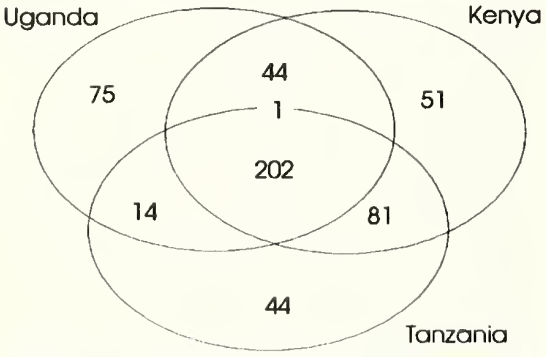

Figure 1: Number of mammal species per country

Species counts are given separately for each order. A summary is presented in Figure 1. The '+1' in Table 1, and the '1' on the border of the Tanzania-ellipse reflects the uncertain position of *Mops nanulus*, the Dwarf Free-tailed Bat: its occurrence in Tanzania needs confirmation.

The left part of Table 2 lists the total number of species occurring in the three countries (*e.g.* for Kenya, columns K, KU, KT and KUT combined). The right part of this table lists the proportion of species, within a given order, that is unique to each of the three countries. These calculations have not been made for the cetaceans, since these were all assigned to both Tanzania and Kenya.

The three countries have an almost equal species count, despite the large differences in surface area (Table 3). Tanzania, for instance, is four times larger than Uganda, while they have 341 and 335 mammal species respectively. The variation in the species count can be explained by the distribution of habitats in respective countries. Tanzania has a relatively homogenous landscape and vegetation. For instance, the *miombo* woodland extends from near the coast to the western part of the

Table 1: Number of species per country/combination of countries

	K	KT	KU	KUT	T	U	UT	Sum
Artiodactyla	5	10	4	24	5	6	0	54
Carnivora	0	1	2	31	2	5	0	41
Cetacea	0	19	0	0	0	0	0	19
Hyracoidea	0	1	1	3	0	1	0	6
Insectivora	9	8	6	16	7	14	3	63
Lagomorpha	1	1	0	2	0	1	0	5
Macrochiroptera	0	1	1	8	3	2	2	17
Macroscelidea	1	2	0	2	0	1	1	7
Microchiroptera	18	9	9 (+1)	51	10	13	3	114
Perissodactyla	1	0	1	2	0	0	0	4
Pholidota	0	0	2	1	0	1	0	4
Primates	1	6	3	7	1	5	2	25
Proboscidea	0	0	0	1	0	0	0	1
Rodentia	15	22	15	53	16	26	3	150
Sirenia	0	1	0	0	0	0	0	1
Tubulidentata	0	0	0	1	0	0	0	1
Total	**51**	**81**	**44 (+1)**	**202**	**44**	**75**	**14**	**512**

Table 2: distribution of species per country. Left part: number of species per country. Right part: proportion of species unique to a country, i.e. species occurring in one of the countries of East Africa, but not in the other two.

	Number of Species			Proportion of 'unique species'			
	K	U	T	K	U	T	Total
Artiodactyla	43	34	39	0.09	0.11	0.09	0.30
Carnivora	34	38	34	0.00	0.12	0.05	0.17
Cetacea	19	0	19	-	-	-	-
Hyracoidea	5	5	4	0.00	0.17	0.00	0.17
Insectivora	39	39	34	0.14	0.22	0.11	0.48
Lagomorpha	4	3	3	0.20	0.20	0.00	0.40
Macrochiroptera	10	13	14	0.00	0.12	0.18	0.29
Macroscelidea	5	4	5	0.14	0.14	0.00	0.29
Microchiroptera	88	76	73	0.16	0.11	0.09	0.36
Perissodactyla	4	3	2	0.25	0.00	0.00	0.25
Pholidota	3	4	1	0.00	0.25	0.00	0.25
Primates	17	17	16	0.04	0.20	0.04	0.28
Proboscidea	1	1	1	0.00	0.00	0.00	0.00
Rodentia	105	97	94	0.10	0.17	0.11	0.38
Sirenia	1	0	1	0.00	0.00	0.00	0.00
Tubulidentata	1	1	1	0.00	0.00	0.00	0.00
Total	**379**	**335**	**341**	**0.10**	**0.15**	**0.09**	**0.33**

Table 3: Number of mammal species per surface area

Country	Surface	Species/ 1,000 Km2
Kenya	582,644	0.650
Uganda	236,578	1.416
Tanzania	939,762	0.363

country, though there are the Eastern Arc Mountains which are a centre of endemism. Kenya and Uganda have more varied landscapes and vegetation, ranging from afromontane forests to savanna ecosystems. The Guinea-Congolian type of vegetation, and its associated fauna, reaches western Uganda, and a small strip is present in western Kenya. So in Kenya and Uganda the diversity of habitats is reflected in a higher diversity of mammal fauna.

The number of species unique to a country is very different for the three countries. Uganda has the highest value of 75 species which are not found elsewhere in the region. Kenya and Tanzania have 51 and 44 unique species respectively. The main explanation for this phenomenon is that Uganda has a high proportion of West African mammal fauna; this is exemplified by the occurrence of *Anomalurus beecrofti* and *Idiurus zenkeri* (both flying squirrels), which have a distribution extending from Uganda to West Africa. The distribution of bats seems to extend further eastward, into Kenya. The possible reason for the shift to the east is because of mobility: a specimen of *Hipposideros camerunensis,* as the name suggests a West African bat, has been collected in Kenya about 1,000 km from the previously known collection (Schlitter, pers. comm.).

As new information becomes available, updates of the *Checklist of East African Mammals* will be published. Also the figures given above are bound to change. It is unlikely, however, that the patterns discussed above will change very much.

Mwangi Gathua (KIFCON Project) and Edward Vanden Berghe (Centre for Biodiversity), National Museums of Kenya, Box 40658, Nairobi

THREE DWARF EUPHORBIAS IN KENYA AND TANZANIA

In the account of a "pot luck outing" to the Kedong Valley, reported in the March 1992 issue of the *EANHS Bulletin*, it was stated that *Euphorbia graciliramea* was seen. The dwarf tufted plants with spiny succulent stems and yellow flowers (more accurately, cyathia) that can be seen in the Kedong Valley have been known as *Euphorbia graciliramea* for most of this century, since the name was published by Pax in 1904. Plants that have been referred to this species have a wide distribution in the Rift Valley and on higher ground on both sides of the valley, in Kenya (K3, 4, 6) and Tanzania (T1, 2, 5) (Agnew, 1974; Blundell, 1987; Carter, 1988).

A few years ago the plants known as *Euphorbia graciliramea* were divided into three species by Carter (1987). The name *E. graciliramea* Pax was retained for plants west of the Rift Valley (in K6 and T1, 2, 5), because the type locality is in the Musoma District of Tanzania. All plants on the east side of the Rift Valley and in localities further east were divided between two new species. Those occurring on, and apparently restricted to, the Laikipia Plateau (K3) are now called *Euphorbia laikipiensis* S. Carter. The other eastern populations (in K3, 4, 6 and T2), including those in the Kedong Valley, are now called *Euphorbia similiramea* S. Carter.

Table 1. Differences between Euphorbia graciliramea, E. similiramea, and E. laikipiensis.

	E. graciliramea	*E. similiramea*	*E. laikipiensis*
Stem			
thickness	5-10 mm	10-15 mm	5-10 mm
shape	4-angled or sub-cylindrical	4-5-angled	4-angled or sub-cylindrical
teeth	± prominent, strictly 4-ranked	prominent, somewhat spiralling	obscure, strictly 4-ranked
Branch length	to 25 cm	to 30 cm	to 10 cm
Spine shields	decurrent to 4 mm	decurrent to 8 mm	decurrent to 4 mm
Spine length	to 20 mm	to 20 mm	to 12 mm
Prickle length	to 1 mm	to 1.5 mm	absent

How do the two new species differ from *E. graciliramea*? Some diagnostic characters taken from the descriptions and identification key given by Carter (1987, 1988) are shown in Table 1. It will be seen that *E. similiramea* has thicker stems, sometimes five-angled, with more prominent teeth that tend to form spirals, and the spine shield extends further down towards the next one below. *E. laikipiensis* has shorter stems with obscure teeth, and shorter spines with the prickles absent.

One question is: which species is illustrated by Blundell (1987: fig 305)? As it is not a very close view it is not easy to identify the plant from this picture, but from what little detail can be seen I am prepared to stick my neck out and say that it seems to be *E. graciliramea*. Perhaps Nigel Pavitt, the photographer, can tell us where he took the photograph.

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Leonard E. Newton, Dept. of Botany, Kenyatta University, Box 43844, Nairobi.

MAZUMBAI FOREST RESERVE

Mazumbai Forest Reserve is a 320 ha island of undisturbed lower mountain forest, on the east ridge of the West Usambara Mountains, at an altitude of between 1,350 and 1,900 m. It is an outstanding forest of more than 80 tree species, growing up to 50 m tall, with an estimated biomass of 1,200 tonnes/ha. The annual increment is yet to be established through ongoing research.

The vegetation composition forms a generalised pattern varying on altitude. *Albizia*, *Agauria*, *Milka* and *Newtonia* species form a belt at the lower boundary, followed further up by *Ocotea* and *Podocarpus* species flourish up to the upper boundary.

The idea to put the area under management of the Division of Forest through the University of Dar es Salaam started in 1968. The original owner of the forest was a Swiss farmer, Mr John Tanner.

He handed over the forest to the University of Dar with the intention of having the area preserved for scientific studies. In 1974 the then Division of Forests assumed the principal administrative responsibility for the area. To date the forest has been maintained in its natural state. The campus has a visitors hostel and camping ground.

The forest attracts scientists of varying disciplines such as zoologists, ornithologists, soil scientists, microbiologists and botanists. More than 138 bird species, 15 mammal species, 300 plant species, amongst which 60 orchids have been recorded there.

Malcolm Johnstone, Balingai Tea Estate, Box 409, Tanga, Tanzania

Announcement

Leslie Brown Memorial Grant 1994

In memory of one of the most inspired and productive raptor biologists of recent decades, the Raptor Research Foundation announces the availability of this grant, for up to $1,000, to provide financial assistance to promote the research and/or the dissemination of information on birds of prey.

Applicants must send a résumé, specific study objectives, an account of how the money will be spent, and a statement indicating how the proposed work would relate to other work by the applicant and to other sources of funds. Proposals concerning African raptors will receive highest priority among proposals of otherwise equal merit.

A complete application must be received by September 15. Proposals, donations, and inquiries about tax-exempt contributions to the fund should be sent to:

Dr Jeff Lincer, Chairperson
RRF Leslie Brown Memorial Fund
9384 Hito Court
San Diego, CA 92129-4901
USA

Society News

East African Mammals Checklist

The EANHS will very soon publish the 'Checklist of East African Mammals'. The compilation of this checklist was started by Dr Jonathan Baranga, then at Makerere University. Dr Glyn Davies and Mwangi Gathua independently compiled a list of Kenyan mammals. The two checklists were brought together and Tanzanian information added by Prof Kim Howell.

The checklist will be available from the EANHS office. Members are invited to send comments and additional observations to the Mammals Working Group (addresses are listed in the Checklist), or to the Editor. New updates of the checklist will be produced regularly, incorporating this information.

New Journal Part

Journal part 82(202), 'Alpine Vertebrates of Mount Kenya, with particular notes on the Rock Hyrax', by Truman Young and Mathew Evans, is with the printers. It will be available from the Society's office soon.

Erratum

The Volume number of our last (September) issue of the *Bulletin* was erroneously given as 'Number 22(3)' in the running title (not on the cover or the contents page). It should of course have been 'Number 23(3)'. Our apologies for this.

MEMBERSHIP:
This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society-National Museum Library (postal borrowing is possible) and copy of the EANHS Bulletin every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

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The Society publishes, in collaboration with the National Museums of Kenya, the Journal of East Africa Natural History. The Journal is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Editor, P.O. Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

EANHS BULLETIN:
This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), P.O. Box 44486, Nairobi, Kenya. Line drawings can be published. Photographs will be considered if they are essential to the article.

SCOPUS:
The Ornithological Sub-committee publishes this journal three times a year, cost KSh. 250 per annum. All correspondence to D.A. Turner, P.O. Box 48019, Nairobi, Kenya.

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Articles and Notes

NOTES ON MOIST FOREST BAMBOOS AND BAMBUSOID GRASSES IN EASTERN TANZANIA

Bamboos and bambusoid grasses can be an important commercial and ecological component of moist forests in Tanzania. In addition a number of species are of phytogeographical interest. This note briefly reviews those species of interest and describes observations on the flowering of two montane species.

The montane and coastal moist forests of eastern Tanzania are rich in endemic species with affinities to the Guineo-Congolian forests of West and Central Africa, and—to a lesser extent—Madagascar (Lovett 1988). Other affinities are with the Neotropics and the Old World. These affinities can be demonstrated by examples in the bambusoid grasses. *Puelia olyriformis* which occurs in the Mahenge (8°46'S 36°54'E) (Clayton, 1970; Lovett *et al.*, 1988) is otherwise only known from West Africa. *Humbertochloa greenwayi* is restricted to the coastal forests of the Pugu Hills (6°55'S 39°02'E) (Clayton, 1970); the only other member of the genus occurs in Madagascar. *Hickelia* sp. aff. *madagascariensis* from montane forests in the southern Udzungwa at Luisenga (8°26'S 35°18'E) and Livingstone Mountains at Lisitu (09°39'S 34°29'E) belongs to an otherwise Madagascan genus. *Maltebrunia schliebenii*, endemic to the Mahenge Mountains, belongs to a genus of five species otherwise known from Madagascar and Gabon (Clayton, 1970). *Olyra latifolia*, a dominant herb in disturbed coastal and lowland forest, is the most widespread species of the neotropical genus *Olyra*. It has been suggested that *O. latifolia* is a weedy introduction into Africa (Sorderstrom & Zuloaga, 1989), but it is readily dispersed and well established through Africa and so it is almost certainly indigenous (Davidse, 1985). *Leptaspis zeylanica*, a broad-leaved species of shade in the wetter forests, is widespread throughout Africa and eastwards in the Old World to the Solomon Islands (Clayton, 1970; Soderstrom *et al.*, 1987). Both *Leptaspis* and *Humbertochloa* are recorded from the middle Miocene deposits in the Kenyan Rift (Jacobs & Kabuye, 1987).

The montane forest bamboo *Sinarundinaria alpina,* which occurs in dense stands and can reach 20 m in height, is sufficiently distinctive and useful to give its name to the mountains on which it grows. In northern Tanzania, the word 'oldeani' is derived from the Maasai for 'bamboo mountain' (Hanby & Bygott, 1989), and in southern Tanzania, 'Rungwe' is the local name for *Sinarundinaria alpina* (Kerr-Cross, 1895). It is used locally for building and basket-making. An inventory of government controlled natural bamboo stands in use in Tanzania gave an area of 64.7 km² (Forest Department, 1962). Production and value of bamboo from these stands for various years is given in table 1. In Tanzania *Sinarundinaria alpina* occurs on the mountains of: Oldeani (03°16'S 35°26'E), Meru (03°14'S 36°45'E), possibly on Kilimanjaro (03°04'S 37°30'E), southern Uluguru (07°08'S 37°38'E), southern Nguru (06°00'S 37°30'E), Ukaguru (06°00'S 33°45'E), Rungwe (09°08'S 33°45'E), Livingstone (09°25'S 34°15'E), and Mahali (06°12'S 29°50'E) (Chao Chi-son & Renvoize, 1989; Clayton, 1970; Pocs, 1976a; Greenway, 1965; Kielland, 1978; Nishida & Uehara, 1981; Brenan & Greenway, 1949; herbarium material at Kew, pers. obs.).

Table 1. Annual utilisation and value of bamboo poles from government controlled natural forests from government reports. NR = not recorded. Value in pounds sterling at date of production. Figures for 1932–1933 include poles in addition to bamboo.

Year	Quantity	Value	Source
1922	6,362	7	Forest Dept., 1923
1923–1928	99,700	1,246	Forest Dept., 1928
1931	271,600	3,000	Forest Dept., 1931
1932–1933	2,332,000	15,564	Forest Dept., 1936
1934–1938	NR	13,480	Forest Dept., 1947
1939–1945	NR	4,600	Forest Dept., 1947
1950	NR	400	Forest Dept., 1951
1962	25,000	NR	Forest Dept., 1962

Herbarium material at Kew shows that *Sinarundinaria alpina* flowered on: Meru in 1946, Ukaguru in 1978, and Rungwe in 1898 and 1913. The flowering of *Sinarundinaria alpina* appears to be erratic. It flowered on Rungwe in 1986 and sporadic flowering continued on the adjacent Poroto Mountains in 1989. After flowering the bamboo dies, leaving large gaps in the forest. In Mufindi on the southern Udzungwa, *Sinarundinaria alpina* has not flowered for at least forty years (T.C.E. Congdon, pers. comm.). In the southern Nguru Mountains the montane forest at 1,800 to 2,160 m in altitude on the headwaters of the Chazi River is remarkably open and appears secondary. However, it still contains *Polyscias stuhlmannii*, a species of restricted distribution, which probably indicates undisturbed forest. Along the southern ridge of the upper Chazi valley, *Sinarundinaria alpina* is regenerating with culms only one or two centimetre in diameter. This suggests that dense stands of *Sinarundinaria alpina* flowered and died back at some time in the recent past, and the species is now regenerating from seed. A few kilometres away in the forest above Maskati *Sinarundinaria* has not flowered in living memory and is large enough to be used for water pipes. In the southern Uluguru the distribution of *Sinarundinaia alpina* does not appear to be related to climatic conditions, suggesting a dynamic situation (Pocs, 1976b). On Kilimanjaro small patches of bamboo have been reported but not confirmed; the absence or rarity of *Sinarundinaria alpina* on Kilimanjaro was considered by Greenway (1965) to be difficult to explain as it is a conspicuous feature of other tall East African mountains (Hedberg, 1951). The flowering and subsequent die-back of dense stands of *Sinarundinaria alpina* must have an important effect on regeneration in moist montane forests, and may account for its possible absence from Kilimanjaro.

Sinarundinaria is not alone in flowering once and then dying back; it is a common phenomenon amongst bamboos (Renvoize, 1991). Another Tanzanian example is the scrambling bamboo *Hickelia* sp. aff. *madagascariensis*, which forms dense thickets at 1,830 m in montane forests on the banks of the Luisenga River, flowered in October 1987 and continued flowering and fruiting for two years before dying back. I collected it sterile at this locality in 1979, and am certain that it did not flower in the interim period. This species was also collected in fruit at Lisitu and Lugalawa in the Livingstone Mountains in 1970.

Another bamboo which grows in Tanzania, *Oxytenanthera abyssinica*, is found in upland wooded grassland rather than moist forest. In Kenya it has attracted interest as a potential plantation species (Kigomo & Kamiri, 1985) and in the Iringa region of Tanzania on the Udzungwa Plateau *Oxytenanthera* is planted extensively under the local name 'mianzi' to produce the

alcoholic beverage 'ulanzi' from sap oozing from the cut stem (Mgeni, 1983; Brenan & Greenway, 1949). It flowers sporadically in cultivation, and clumps of dying mianzi can be seen amongst healthy ones. The collection of ulanzi provides an example of the usefulness of bamboos. The hollow stems of *Sinarundinaria alpina* are used to make 'mbeta' in which *Oxytenanthera* sap is gathered, and the slender stems of *Hickelia* are used as straws to drink the fermented brew.

Acknowledgements

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KAHUZI-BIEGA NATIONAL PARK

Introduction

The Kahuzi-Biega National Park is situated in eastern Zaire, northwest of Bukavu. The original 600 km² park is entirely montane, with an altitudinal range of 1,800–3,308 m. The extension to 6,000 km² includes a narrow corridor of transition forest and a huge lowland forest (700–1,500 m).

The Kahuzi-Biega National Park was created in 1970, upgrading a forest reserve already in existence since 1960. The Extension was established in 1975. The principal reason for the establishment of the park was to protect its population of Eastern Lowland Gorilla (*Gorilla gorilla graueri*). Although several national parks have been established to protect them, they are threatened by extinction as a result of increased habitat destruction, agricultural encroachment and poaching. In this context, they are listed as 'endangered' by the International Union for Conservation of Nature and Natural Resources (IUCN). The World Heritage Site status was accorded in 1980, in recognition of the overall ecological importance of the Kahuzi-Biega National Park.

The GTZ (German bilateral cooperation organisation) has established, in cooperation

with IZCN (Institut Zairois pour la Conservation de la Nature), a conservation and rural development programme in the Kahuzi-Biega region.

The corridor

Our expeditions were confined to the corridor. Some villages inside the park boundaries were affected by the extension of the park. Their inhabitants are entitled to use existing fields, but slash-and-burn tree felling, hunting and prospecting for minerals are forbidden, as well as the extension of the cultivated plots.

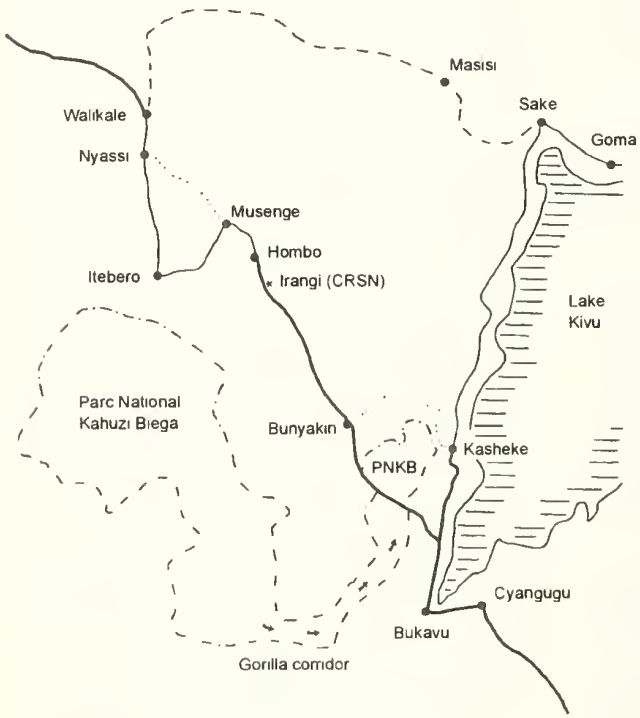
The main purpose of visiting the bridge zone between lowland and highland forest was to take an inventory of the populations of bigger mammals (with special emphasis on gorillas, chimpanzees and elephants) and to analyse human disturbancies. In particular, the corridor's biological value as a linkage between montane and lowland forest and as a possibility of outbreeding (genetical exchange between populations) are said to be threatened.

Socio-economics

The corridor is situated in the settlement area of the Bashi, who farm and hunt to satisfy their basic needs and prospect for gold to attain some property. Their ruler, who is called 'Mwami' (King) reigns over them with absolute power and taxes farmers, merchants and gold prospectors.

Often the local population voices the opinion that their interests are neglected by the park authorities. The Bashi consider the use of the rain forest as their traditional right and do not comprehend reasons for the intervention of park authorities, who deprive them of additional sources of income. In particular, the villagers must go without hunting which is an essential part of their culture. In addition, many men are lured into the park by the hope of a great gold strike. The Mwami considers the park as an intrusion into his sphere of influence.

The destruction of forest outside the park is nearly complete. The landscape has become a patchwork of small agricultural plots and family compounds.



Map of the region

Expeditions to the corridor

As no expedition to the corridor had been conducted before, additional geographical information was mapped on a satellite-based map. The objective of each expedition was to travel through a designated area of the corridor and record as much as possible of the large mammals and their signs as well as topographic features and signs of human disturbances. In order to analyse primate distribution we adopted methods similar to those

used in areas with low densities. We recorded all primate signs (feeding remains, knuckle prints, day and night nests, dung) along our transects, along game trails and human paths. However, evidence of gorillas entering the bridge zone between lowland and montane forest was scarce. Gorrilas seemed to avoid the corridor. Human disturbance in the transition forest prevents gorillas from making contact with their neighbours and reduces the possibility of outbreeding. Chimpanzees have a far wider distribution within the corridor, though also their presence is strictly confined to non-poached areas. In this case the distribution of chimpanzees can be seen as an indicator for the degree of human disturbance. Furthermore we found out that the last elephant was shot in 1988. Since then no elephant had been seen in corridor.

The aim of the expedition to the corridor was to record intensity and effects of poaching on mammal populations. The only people said to stay for a long time in the forest are cassiterite and gold prospectors, who also hunt to support themselves during their expeditions. However, passive hunting using traps by people who were in the forest as miners was found to be common. Professional poachers do not visit the corridor, because populations of larger mammals have decreased or even been eradicated. As the human population grows, agricultural encroachment threatens the corridor. Other items removed by local people include timber and medicinal plants.

Project activities

The Extension is subject to considerable poaching and encroachment. The Kahuzi-Biega Project is trying to convince people living in the vicinity of the park of the rain forest's great ecological significance and to decrease the pressure on the park by improving the local living conditions. Aspects of the GTZ programme dealing directly with the park include development of infrastructure, application of advanced agricultural methods, environmental education and improvement of knowledge of the Kahuzi-Biega region. Project activities that have been identified as being of great use are vegetational studies, supported by aerial surveys, mapping, research into environmental impacts of mineral prospecting and hunting, and faunal survey work. The improvement of agricultural methods include agroforestry, protection against erosion, renewal of unpassable roads, tree nurseries and terracing. As Grauer's gorillas face a serious threat of local extinction in unprotected areas throughout their range and very little is known about their distribution, Wildlife Conservation Society (WCS), Berggorilla & Regenwald Direkthilfe (BRD) and Institut Zairois pour la Conservation de la Nature (IZCN) decided to conduct an overall Grauer's Gorilla census. The first phase was started in January '94 and includes a methods standardisation workshop.

Outlook

Unfortunately Zaire's desolate situation has not improved during the recent years of political turmoil, so that project activities can be conducted only with less financial support. We can only hope that politics will improve —without bilateral cooperation the Kahuzi-Biega National Park cannot resist the human threat.

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OBSERVATIONS ON FLOWERING OF *Sansevieria robusta* IN KENYA

The genus *Sansevieria*, consisting of about 60 species, is widespread in tropical Africa, Madagascar, Arabia and southern Asia, and it is well represented in East Africa. The last monograph is now nearly 80 years old (Brown, 1915). A more recent general account is given by Pfennig (1977), but it is incomplete and lacks an identification key. Some species are of minor importance for medicinal purposes, but the main economic value of the genus is as ornamental plants and as a source of fibres. Interest in sansevierias as ornamental plants led to the recent launching of a periodical devoted entirely to them (*The Sansevieria Journal*, 1992+). Some species have been used as sources of fibre on a local basis for many years; hence the use of such vernacular names as 'bowstring hemp' and 'wild sisal'. Before synthetic fibres achieved their present dominance, attempts had been made to breed improved cultivars for commercial use as fibre crops. One of the most successful seems to have been the hybrid cultivar 'Florida H-13', produced in the University of Florida Agricultural Experiment Station, Gainesville (Parker, 1962; Wilson *et al.*, 1962).

There have been many studies on the taxonomy, morphology, anatomy, genetics, biochemistry, propagation and agronomy of sansevierias. However, it seems that the floral biology and reproductive capacity of sansevierias in the natural habitat have not been investigated. No entries on these aspects were seen in the comprehensive bibliography compiled recently by Eissen and Niedz (n.d.).

Sansevieria robusta N. E. Br. is a widespread and conspicuous plant in many arid areas of East Africa. The plant has shoots of up to 14 distichous leaves on a short stem arising from a subterranean rhizome. Several shoots arise within a small area, and the whole plant forms a clump that is sometimes very dense. The leaves, which can reach a length of over a metre, have a laterally compressed cylindrical shape, with a broad triangular groove down the inner side, and a sharp spine for an apex. They are dark green, with darker longitudinal striations. The inflorescence of *S. robusta* is an erect panicle, about one metre or more long. The flowers are nocturnal, and so they are rarely seen open.

Materials and methods

During a visit to Lewa Downs Ranch, near Isiolo, many plants of *Sansevieria robusta* were found in bud. One large shoot with the inflorescence in a fairly advanced bud stage was collected, complete with a substantial length of rhizome. This was planted in my garden in Kahawa, north-east of Nairobi, at an altitude of 1,500 metres. The nearest natural populations of this species known to me are along the road from Kajiado to

Elangata Wuas, less than 100 km from Kahawa.

In cultivation the plant was observed daily, and dates of first and last flowers were recorded. The number, sequence, dates and duration of flowers opening in each fascicle were recorded by tagging individual buds, and the total flowering capacity of the inflorescence was estimated. Twenty flowers were artificially self-pollinated and sealed with adhesive tape to test for self-compatibility. Five branches were enclosed in light-proof tubes at 14:30 hours and examined for signs of anthesis at 17:30.

During one night the inflorescence was observed at 15 minute intervals from 17:00, which was about two hours before sunset, to 20:00. Thereafter the observations were made at one hour intervals until 05:00 the next morning, when observation at 15-minute intervals was resumed and continued until 09:30. Observation of events in the periods 18:00 to 20:00 and 06:30 to 09:30 was repeated twice during the flowering period of the inflorescence.

A voucher specimen of the plant on which observations were made has been deposited in the East African Herbarium, National Museums of Kenya, Nairobi. The specimen was collected in the plains west of Lengishu Hill, Lewa Downs Ranch, 0°24'N 37°27'E, 1,160 metres altitude (*Newton 3800*).

Observations and discussion

The inflorescence produced one to four spreading branches from each of 14 nodes along the main axis, and several lower branches had secondary branches. Each branch had between 15 and 39 fascicles of flowers. Flowers also arise from the main axis at the base of each branch, and from several fascicles on the terminal portion above the uppermost branches.

The first flower opened on 13th February, and the last on 22nd May, and so the total flowering period was 99 days. In the field, inflorescences in a population were seen to be in more or less the same stage of development. Thus an entire population has a total flowering season of a little more than 14 weeks. Each fascicle produced six or seven flowers, opening in succession. On any one night, flowers opened on all parts of the inflorescence. With buds at various stages of development in each fascicle, only one flower opened at one time in any one fascicle. Periods of up to three days were recorded between the opening of successive flowers on one fascicle. Consequently, not every fascicle had an open flower during each night of observation.

Flowers started to open at about 18:15, when the plant was still illuminated by the sun. No opening of flowers occurred in any of the inflorescence branches enclosed in light-proof tubes early in the afternoon. As flowers started opening before sunset, and they failed to open when covered during the day, the stimulus for anthesis remains unknown.

As a flower opened, stamens spread outwards with the tepal lobes, and dehiscence of anthers was seen to start soon after 18:30. The stigma was seen to be sticky, and probably receptive, at about the same time. Also at this time, a strong sweet scent was evident. By 19:00 the tepal lobes had started to curl back, leaving the stamens standing free. The flowers were fully open by 19:30, with the tepal lobes curled right back on themselves so that the apices were pointing forward again and in contact with the tube. The entire inner surface of the perianth was a very pale cream colour, almost white. The filaments and style were white. Nectar was seen in the perianth tube.

By 06:30 the following morning, when it had become light enough to make observations without the use of a torch, the tepal lobes had started to uncurl. Final closing was slow, but all flowers were seen to be fully closed by 08:15. During the final

stages of closing, anthers remained exserted 2–3 mm and the style 4–5 mm. Flowers that had opened were shrivelled and dry by 09:30. Fifty flowers were tagged in the late bud stage, and it was found that all opened for only one night.

Some animal visitors were seen. Two species of moth, one larger than the other, were seen visiting from about 19:15 to 23:00. The smaller species was seen most frequently during the periods of observation, with up to four individuals visiting the inflorescence at any one time. As they were immediately attracted to my head-torch when I approached it was not possible to observe their behaviour on the flowers, but captured individuals were found to have pollen on their heads. One species of bee was seen visiting almost closed flowers at about 07:45 to 08:00. Captured specimens of all visiting species were given to the Department of Entomology in the National Museums of Kenya for identification, but on checking later I found that the specimens had been lost in the department and no names were supplied. One evening I found that I was not alone in trying to capture visiting insects; a gecko was seen waiting on a leaf close to an open flower on a branch of the inflorescence.

With nocturnal opening, whitish colour, strong sweet scent, and nectar production, *Sansevieria robusta* flowers have a typical phalaenophilous pollination syndrome (pollination by moths). This was confirmed by the observation of moths visiting flowers in the late evening. As there are natural populations of this species not very far from the garden where these observations were made, it is possible that the same insect species are involved in the natural habitat. As two species of moth were seen, there is no pollinator specificity. Captured specimens of the small bee seen visiting flowers in the morning had collected pollen. At that time the stigma appeared dry and probably no longer receptive. Therefore it is likely that this visitor was just a scavenger, collecting remaining pollen but playing no role in pollination.

The total flowering capacity was estimated on the basis of average numbers of flowering fascicles per branch plus number of fascicles on the main axis, and average number of flowers per fascicle. The figure of 7,332 flowers was arrived at, and so it can be said that the inflorescence was capable of producing a total of approximately 7,000 to 7,500 flowers. As each ovary has three ovules, the total potential seed production per inflorescence is approximately 21,000 to 22,500.

Artificially self-pollinated and sealed flowers failed to set fruit. Neither were any fruits formed on the rest of the inflorescence, with open pollination. Examination of closing flowers with a microscope revealed many pollen grains scattered on the style and stigma, indicating that pollination had taken place. As this was an isolated plant it is assumed that the pollen originated from other flowers on the same inflorescence. These observations suggest self-incompatibility, but they do not represent a sufficiently comprehensive investigation to draw final conclusions. Even in the field, few mature fruits are seen on post-anthesis inflorescences.

During the day, many ants were seen on the inflorescence. On close observation they were seen to be gathering minute droplets of a liquid that was exuded below the base of the bracts subtending the flower fascicles, presumed to be extra-floral nectaries. No obvious nectaries could be seen under the dissecting microscope, and it seems that just a few cells at the base of a bract are secretary. These obscure extra-floral nectaries were first reported in *Sansevieria thyrsiflora* Thunbg. by Mattei (1905), and they are now known to occur in most species. What purpose there can be in attracting ants during the day, when there are no open flowers, is not clear. No ants were seen on the inflorescence at night, when the extra-

floral nectaries could be considered as decoys to prevent ants taking nectar from flowers. Mattei (1905) states that the purpose is to protect young flowers buds, but from what? I saw no other visitors attempting to approach flower buds during the day. These particular ants did not appear to be very belligerent when disturbed, and they were not impressive if they had some protective role.

Whilst the observations reported here were not carried out in situ, in the natural habitat, Kahawa is on the drier side of Nairobi and about 200 m lower than the city centre. In altitude and climatic conditions the site of my garden matches some localities in the natural range of *Sansevieria robusta*. Further observations in the field are desirable, especially as this would allow planned observations on a population basis rather than on an isolated plant. More information on animal visitors is also required. However, it is expected that most of the details presented here will not be found to vary in the natural habitat.

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ASTOUNDING ENCOUNTER ON THE NESTING HABITS OF THE PIED CROW

Recently, I cut down a big *mvule* tree in my plot (excuse me for the damage to the environment) to make way for further development. Among the branches were two big nests build by pied crows. I had watched the birds for some time before I had to cut the tree. Originally the tree had been inhabited by kites, but later the pied crows seemed to have driven away the kites and taken over the *mvule* tree empire.

After overcoming the initial anxiety of whether the tree was to hit the nearby house—and thank God, it landed where we wanted it to rest—we all rushed to check on the nests to check for the young or eggs. What surprised us most was the huge collection of wires. The pied crows had gone modern! They had given up the idea of building their nests with branches and twigs, and had resorted to constructing semi-

permanent nests using wires. Is it accidental? Apparently it was not for the crows involved: when the children also got interested in the nests and started dismounting them, I noticed that the birds started coming back to collect the wires and re-erect the nests on another tree. I have kept the nests for reference for whoever is interested.

John Mbidde, c/o EEC Delegation in Uganda, Box 5244, Kampala

This letter was communicated through Prof Pomeroy of Makerere University. According to Prof Pomeroy, this is the first report of pied crows using wires as nesting material, though they are known to have adapted to modern times in other ways (like nesting on power- and telegraph poles). Anyone with similar observations is invited to send a note to either Mr Mbidde, or to the Editor, EANHS Bulletin.

IS THE DIET OF THE OSTRICH SIMILAR TO THAT OF GRANT'S GAZELLE?

The wild Ostrich (*Struthio camelus massaicus* Neumann) is similar in certain ways to ungulates, such as the Giraffe (*Giraffa camelopardalis* (Linnaeus)) and Grant's gazelle (*Gazella granti* Brooke) with which it coexists year-round on the Athi Plains of Kenya. I present data gathered towards an eventual comparison of the Ostrich with ungulates, based on their feeding ecology.

The proventriculus or glandular stomach (hereafter referred to as stomach) of the Ostrich precedes its gizzard, and is packed with largely intact, undigested food material. Three stomachs of mean empty mass 1.6 kg had a water-filled capacity of mean 5,613 ml (SD 1,791 ml). I examined 28.4 kg of fresh contents of stomachs of four female and five male adult or near-adult ostriches on Wildlife Ranching and Research, 40 km south-east of Nairobi. Here the Ostrich has been incorporated into a pioneering programme in consumptive use of wildlife in Kenya. Most birds were culled in the dry seasons of 1987-1988: four in November, one in January and three in March. One bird was culled in the rainy season (November 1988). The percentage contribution of each food taxon and item to the fresh mass of the contents of each stomach was assessed. This was done by weighing in the case of *Balanites glabra* Mildbr. & Schlect (an evergreen, thorny shrub or short tree which is a favourite food of ungulates), or by estimation by eye in the case of other taxa.

Ostriches thrive in the study area at a high density of two birds per km^2, with no evidence of overpopulation (Hurxthal, 1979). The vegetation is grassland, with scattered *B. glabra* and *Acacia drepanolobium* Sjoestedt, on undulating volcanics 1,600 m above sea level (mean annual rainfall 510 mm; Stelfox, 1986).

Stomach contents had fresh mean mass 3.1 kg (range 1.3–4.4 kg). The stomachs contained predominantly green material derived from perennial plants, and none yielded more than traces of dry plant matter. Every stomach included a mixture of plant taxa (8–14 species). The ostrich appears to spread its daily foraging among herbaceous and woody plants over a wide range of heights above ground. The presence of roots showed that the birds had dug up some of their food, as suggested by Williamson (1987). At the other extreme, ostriches have been incidentally observed at least six separate times, browsing on *B. glabra* at a height of about 2 m (pers. obs.; S. Thomsett, pers. comm.).

Found in virtually every stomach were:

- *Commelina*, a fleshy herbaceous perennial, thinly scattered among the grasses in the study area,
- foliage of *Hibiscus* (Malvaceae), a common, multistemmed sub-shrub (just emerging above tall grass stratum), which retained its leaves in the dry season, and
- *B. glabra* (Tables 1 & 2).

That they ate Malvaceae and Solanaceae is noteworthy in view of the avoidance of certain members of these families by the domestic Ostrich (Smit, 1963).

Foliage formed the bulk of the contents of every stomach, and consisted of buds, leaves and shoots, including traces of woody stems. Grass was found in several stomachs, forming most of the contents of the stomach (tables 1 & 2). The stems and expanded leaves of just the woody and subligneous species alone comprised at least 3% of the contents of every stomach, approaching 50% in one case. An important item was leaves of *Aspilia mossambicensis* (Oliv.) Wild (Asteraceae). A few mature thorns of *B. glabra* and one thorny ant-gall of *A. drepanolobium* were present. Foliage of *B. glabra* was a minor part (mean 3.5%, maximum 10% of mass of contents of each stomach) of the diet of the ostriches sampled. Many of the leaves of *B. glabra* found were yellow ones presumably picked up from the ground.

Some form of fully succulent (rather than merely fleshy or tender) plant matter was present in small quantities in virtually every stomach (total not exceeding 15% of the contents of any one stomach):

- swollen stem-bases of *Commelina*,
- foliage of *e.g. Aloe* and *Euphorbia*,
- fruits of *B. glabra*, *Solanum* and Cucurbitaceae.

Legumes (Fabaceae and Mimosaceae) were not a particularly large component of the diet overall, although the foliage of herbaceous legumes occupied up to a third of one stomach, and there were many pods of *A.*

Table 1. Quantitative composition of food plant taxa found in the stomachs (proventriculi) of nine ostriches from *Balanites glabra-Acacia drepanolobium* grassland on Wildlife Ranching and Research, on the Athi Plains, 1987–1988.

Food taxon		Percentage of mass of stomach contents		Present in number of stomachs
		Mean	Range	
1.	Malvaceae	19	5-40	8
2.	Commelinaceae	16	0.1-60	9
3.	Poaceae	17	0-75	7
4.	Asteraceae	24	0-90	5
5.	Balanitaceae (*B. glabra*)	5	0.1-22	8
6.	Solanaceae	5	0-20	4
7.	Fabaceae	4	0-30	1
8.	Mimosaceae (*A. drepanolobium*)	2.5	0-20	4
9.	Liliaceae	2	0-6	4
10.	Euphorbiaceae	<0.5	0-2	3
11.	Cucurbitaceae	<0.1	0-0.5	1
12.	Cyperaceae	<0.1	0-0.1	1
13.	Unidentified	4.5	0-15	9

Table 2. Quantitative composition of food items found in stomachs (proventriculi) of six ostriches from *Balanites glabra-Acacia drepanolobium* grassland on Wildlife Ranching and Research, on the Athi Plains, 1987–1988. All food items are mutually exclusive

Food item		Percentage of mass of stomach contents		Present in number of stomachs
		Mean	Range	
1.	Leaves and shoots (excluding grass)	71	15-90	10
2.	Grass (including tuft bases and roots; excluding heads)	17	0-75	8
3.	Fleshy stem-bases (Commelina)	3.5	0-75	5
4.	Pods of legumes (including seeds)	2.5	0-20	5
5.	Fleshy fruits (including seeds)	1	0-5	5
6.	Succulent photosynthetic organs	1	0-4	5
7.	Seed capsules including seeds (Malvaceae, Liliaceae)	0.5	0-1	6
8.	Inflorescences and flower-buds	<0.5	0-0.5	6
9.	Bark and gum	<0.5	0.0.5	1
10.	Invertebrates: snail; armoured ground cricket (Orthoptera); ladybird beetles (Coleoptera: Coccinellidae)	<0.5	0-0.2	3
11.	Other (including bone fragment)	3	0-5	10

drepanolobium in another. However, in the study area with its relatively rich soils (Stelfox, 1986), foliage of *B. glabra* may be a more concentrated source of protein than that of legumes such as *Acacia* (Reed, 1983).

Flowers and seeds were surprising scarce, contributing no more than 10% in any stomach, even including the kernels inside the fleshy fruits of *B. glabra*. Fully mature, dry seeds were absent. Animal matter (total <0.02% of stomach contents) was restricted to traces of bone and three types of invertebrates (table 2).

These results confirm that the wild ostrich is largely herbivorous (Robinson & Seely, 1975; Brown, Urban & Newman, 1982). Apart from the scarcity of legumes and seeds, the diet roughly agrees with that preferred by the domestic bird (Smit, 1963). The Giraffe in the study area depends on *Acacia* spp. and *B. glabra* at heights of 1.5–3 m (Milewski, in prep.). It occasionally stoops to take the Ostrich food plants *Hibiscus* and *Solanum,* few of which are taller than 1 m. There is therefore a limited but noteworthy dietary overlap, mainly in the use of *B. glabra* foliage, between Ostrich and Giraffe. Grant's Gazelle eats foods remarkably similar to those recorded here for the Ostrich (Talbot & Talbot 1962; Hofmann, 1973; Spinage, Ryan & Shedd 1980), with the possible exception of *Acacia* leaves and shoots not so far found in the diet of the bird. The Ostrich shares much of its habitat with Grant's and closely related gazelles, with a similar degree of independence from free water (Hofmann, 1973; Brown, Urban & Newman, 1982; Williamson, 1987). The ecological separation of Ostrich and Grant's Gazelle would repay further investigation.

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Field Trip Report

POT LUCK OUTING, 19–20 MARCH 1994

On 19th March, we decided to go to Lukenya Hill ahead of the other pot luck goers. Our group consisted of Jennifer Oduori, Yvonne Macolm-Coe and myself. The hill is a hot-spot and paradise for bird-watchers and rock-climbers, and has an aethestic value for landscape photographers too! I shall never forget my first visit there. Our first stop was a small man-made wetland where we saw Sacred Ibis, Egyptian Goose and Yellow-billed Stork.

Making our way up-hill we spotted Tawny Eagle perched on a large fig tree by the rocky edge. *Croton dischogamous* and acacia were common; other shrubs such as *Rhus natalensis*, *Clausena anisata*, the lichen 'Old man's beard', and parasitic *Loranthus* were evident.

After setting up a base camp, and having a snack for lunch, we moved around the hill, stopping briefly at convenient spots while birding. Overhead a flock of Eurasian White Stork soared. Overlooking the cliffs was a pair of Verreaux's Eagle and a Cliff Chat. A flock of Red-winged Starling flew to and fro across the hill. On the rocks Cinnamon-chested Rock Bunting was seen, while in the bushes around the Wailing Cisticola was calling and giving us remarkable fancy poses. A herd of Impala and a number of Rock

Hyrax were also seen. As darkness began to fall, members of the Mountain Club of Kenya joined us. They had come in to do their technical climbs the next day. While barbequeing, the Freckled Nightjar and Montane Nightjar called to be given a notice too!

The next morning, while on a breakfast spree, we had a greet view of the Great Spotted Cuckoo. Descending down the hill to meet our fellow potluck goers, we saw African Golden Oriole, Northern Wheatear, Superb Starling, Red-headed Weaver and Eurasian Rock Thrush.

The sharp eyed bird-watchers caught up with the first fast flying Lesser Kestrel, Lanner Falcon. Other birds included Grey-backed Camaroptera, Robin Chat, Scarlet-chested Sunbird, Garden Warbler, African Rock Martin, Black-backed Puffback, African and White-backed Vulture and Rüppell's Vulture.

We gathered round the famous *Acacia kirkii* picnic site, having lunch and the sun was scorching hard. It seemed the Grey Hornbill, Banded Parisoma and Familiar Chat wanted to be noted as they started to display with fury. A Grey Flycatcher was busy flittering in and out of the same tree.

This camping weekend was a follow-up to a previous short visit to the area by Yvonne, when it was observed that due to the good rains which had fallen, the birdlife was exceptionally rich. The Potluck participants were not disappointed. Many bird species were seen, and there was a lot of displaying and vocalisation. Those interested in obtaining a checklist please get in touch at the address given below.

Kuria Ndungu, Department of Ornithology, National Museums of Kenya, Box 40658, Nairobi

Announcement

Forest mammal atlas of Kenya

This is a follow-up to the letter sent to the members soliciting contributions to the above atlas. Please address all reports and inquiries to:

Mwangi Gathua
Mammal Atlas Project
Mammalogy Department
National Museums of Kenya
Box 40658, Nairobi

Society News

The 'Check-list of Mammals of East Africa' has been printed, and is available from the Society's office. Revenues of the sales will be used to the cost of future editions. Any corrections, additions or suggestions for alterations can be sent to Dr E. Vanden Berghe, at the Society's address.

Journal part 82(202), 'Alpine vertebrates of Mount Kenya, with particular notes on the Rock Hyrax', by T. Young and M. Evans, has been printed and is available in the office. This part concludes the Journal series in its present form. Starting from now, contributions will be bundled and published as two issues per year. Publication of the Journal will be done jointly between the National Museums of Kenya and the EANHS. The numbering of the new Journal will follow on from the old Journal.

Ballya 1(2) is also back from the printers, and is available from the office. Members who subscribe separately to Succulenta EA should receive this publication through the mail.

MEMBERSHIP:
This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society-National Museum Library (postal borrowing is possible) and copy of the EANHS Bulletin every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

JOURNAL:
The Society publishes, in collaboration with the National Museums of Kenya, the Journal of East African Natural History. The Journal is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Editor, Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

EANHS BULLETIN:
This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), Box 44486, Nairobi, Kenya. Line drawings can be published. Photographs will be considered if they are essential to the article.

SCOPUS:
The Ornithological Sub-committee publishes this journal three times a year, cost KSh. 250 per annum. All correspondence to D.A. Turner, Box 48019, Nairobi, Kenya.

BALLYA:
This bulletin is published three times a year by Succulenta EA, a division of the EANHS. Members of the EANHS can join Succulenta EA, at a cost of KShs 400 per annum, and receive*Ballya*. Contributions for *Ballya* can be sent to Edward Vanden Berghe, Box 44486, Nairobi, Kenya

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* Full-time students (including university undergraduates) or children under 18.

Subscritions are due on 1 January. From 1 July you may join for half the yearly subscription and receive publications from that date. Application forms for membership are obtainable from the Secretary, P.O. Box 44486, Nairobi, Kenya.

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Chairman's report for 1993/94

Ladies and Gentlemen,

It is indeed a pleasure to welcome you all to the 84th Annual General Meeting of the Society. The last twelve months have been busy ones for the Society and, as our activities continue to expand, there is a danger that my report will do likewise. I will try to be both succinct and comprehensive, but if I fall short on either count I hope that you will forgive me.

Our Hon. Secretary, Lorna Depew, moved to Kilifi in July 1993 but has continued, on a commuting basis, her active supervision of the office and the Society's day to day affairs. In this she has been ably assisted by our new Office Manager, Jennifer Oduori. Our previous Office Manager, Joseph Oyugi, took up a full-time position at the National Museums of Kenya in June 1993: we wish him success in his new post. Our thanks, as always, to those who volunteer to assist in the office with the various tasks, often mundane, that keep the Society on track. Their contributions are generally unsung, but are extremely important.

Over the past year we have had a full programme of lectures and films, organised in the main by Judith Rudnai. The subject matter has ranged throughout East Africa and beyond, and just as widely taxonomically; among others we have heard presentations by Tom Butynski on the Impenetrable Forest, Lise and Tim Campbell on Canadian seals, Dave Richards on owls and vultures, Daniel Okeyo on fish breeding, Glyn Davies on indigenous forests, Munir Virani on the Sokoke Scops Owl and Phil Hockey on migrant wading birds. My thanks to all the speakers and organisers for giving us such an interesting and varied programme.

Regrettably, the quantity and quality of field outings have been less satisfactory. The monthly pot-luck outings and the evergreen Wednesday morning bird-walks continue to thrive, but for visits further afield we have been badly affected by the lack of an outings organiser. I am happy to report that Major Kaigwa has now volunteered to assist us in this role. He has extensive experience of organising such events for the Uvumbuzi Clubs, and we should soon see a resurgence of scheduled outings: probably day trips for the time being. I would encourage members to give Major Kaigwa their support and turn up in enthusiastic droves: it seems as though many of us are out of the habit of taking part in Society excursions.

Turning to publications, the Society's increasingly varied range of periodicals has continued to appear, if not always promptly, then with compensatory verve and style. Our periodicals now include the new-look *Bulletin*, the *Journal*, *Scopus*, *Kenya Birds*, *Wetland News* (once in a while), and, newest of all, *Ballya*—of which more later. My thanks to the editors and compilers of all these, and particularly to Edward Vanden Berghe, who, while not exactly unburdened with other duties, continues to spend an enormous amount of time in the Society's cause on several of these publications. It is a disappointment to me personally that the first issue of our joint journal with the National Museums, renamed the *Journal of East African Natural History*, has not yet rolled off the presses. There are no sinister reasons for this; it is simply that all those involved in the Editorial Board are extremely busy people. I can but reiterate my hope, expressed at last year's meeting, to see this publication out soon.

Other Society publications during the year included the *Checklist of the Mammals of East Africa*. The *Checklist of Birds of Nairobi* and a new edition of *Upland Kenya Wild Flowers* are nearing the final stages of preparation at the moment.

Our specialised sub-committees continue to flourish—and to increase in number. The newest in the group is Succulenta East Africa, devoted to the study and propagation of fleshy plants. After its inaugural meeting on 5 June 1993, Succulenta has never looked back and,

under Dee Raymer's leadership, has had a very full and active programme. Outings to Kitengela, Meyer's Ranch and Baringo have been organised, among others, and several up-country groups set up. In addition, Succulenta has already produced two issues of *Ballya*, an informative new journal on East African succulents—named, for those who are wondering, in honour of the late Peter Bally. EANHS members who wish to receive *Ballya* and attend Succulenta outings pay a small extra charge on top of their usual subscription.

The Ornithological Sub-committee continued to busy itself with the revision of the East African checklist, the production of *Scopus*, the organisation of the Ngulia ringing programme, and the coordination of other ringing activities in eastern Africa. BirdLife Kenya, meanwhile, put much of its energy into organising the Kenyan contribution to World Birdwatch '93, which took place on 9–10 October 1993. The event was highly successful: 799 bird species were recorded, the highest for any country in the world, and more than KSh 300,000/= raised for bird conservation projects. Most importantly, over 270 birdwatchers enjoyed a weekend of non-stop birding, and a great deal of publicity was generated.

During the year BirdLife Kenya also gave financial support to a study of the endangered Hinde's Babbler, and to the renovation of the Grey Crowned Crane research station at Saiwa Swamp. Through this sub-committee the EANHS should soon become the partner organisation of BirdLife International in Kenya; this is already the case in Uganda.

The Kenya Wetlands Working Group continued to track wetland issues and to organise the July and January waterbird counts, in which many EANHS members participate. The Wetland Inventory Project, funded by the Netherlands Government, made good progress: a questionnaire was completed and widely circulated, and responses are presently being compiled by two inventory officers. Unfortunately the KWWG computer was stolen in March from the National Museums of Kenya, which has put a brake on the project's database work.

KWWG was also closely involved in the organisation of two important workshops, both held in Nakuru last year: the first, in May, discussed research and management planning for Lake Nakuru and its catchment; the second, in November, examined wetland biodiversity in East Africa, with a day devoted to the Lesser Flamingo.

Friends of the Nairobi Arboretum, a project of the Society, had an active and productive year. Highlights included the celebration of World Environment Day in the arboretum; an arboretum management planning consultancy arranged through the Kenya Indigenous Forest Conservation Programme; the production of a brochure; and the receipt of a grant for more than KSh 650,000/= from the Netherlands Government. The Netherlands funding will finance the construction of an information centre and a new toilet block. The year rounded off appropriately with a birthday party for FONA's first anniversary.

One of the most encouraging developments to report on this year is the active resurgence of our Uganda Branch. Technically a sub-committee under section 29 of our constitution, the branch has paralleled the main society in setting up a Uganda Wetlands Working Group and a bird conservation group, BirdLife Uganda. As mentioned above, BirdLife Uganda is now the BirdLife International partner in Uganda. It is soon to receive a grant from the Royal Society for the Protection of Birds that will allow it to set up an office and employ a full-time officer to work on the Uganda Important Bird Areas project. The Uganda Branch chairman, Panta Kasoma, his Executive Committee and the sub-group convenors deserve our thanks for their hard work and enterprise; we hope to hear more about their activities in the coming months. As the Uganda Branch expands, its relationship with the main EANHS will need some re-examination and the incoming Executive Committee will be turning its attention to this in due course.

Our Hon. Treasurer, Brooks Childress, left Kenya in August 1993. We have been extremely fortunate that Dudley Lucas, who is both amateur herpetologist and professional accountant, was prepared to step into the breach and take over management of the Society's finances temporarily. Dudley has given us his time and expertise despite an extremely busy schedule. His other commitments mean that he can no longer continue in the role of Hon. Treasurer, but I would like to offer him the Society's sincere thanks and hope that we may still be able to turn to him occasionally for advice.

Dudley will give a full report on our financial affairs in a few minutes. At this point, I should simply say that they remain sound despite continuing increases in our costs. All members will be pleased to hear that as a result we propose no increase in the membership subscription this year. To a large extent this happy circumstance is due to the indefatigable efforts of our Fund-raising Sub-committee, spearheaded by Glyn Davies. We have received sponsorship and donations from numerous sources over the last year, and I would like to thank all those who have offered support. In particular I should mention the family of the late Kenneth Young, the Kenya Indigenous Forest Conservation Programme, the Eden Wildlife Trust, the Kenya Wildlife Service and the estate of the late Jean Hayes, all of whom have generously supported our publications. Needless to say, continued fund-raising (and support from our Sponsors and Corporate Members) remains essential for the secure future of the Society.

Some of you may be aware that our Patron, John Karmali, left Nairobi earlier this year for a new home in the United Kingdom. I am sure that you will join me in wishing him all the best in his new surroundings, and in hoping that physical distance will not diminish his involvement and interest in the Society's affairs.

This report shows signs of carrying on for far too long, but let me conclude by mentioning some exciting new developments that are in progress. Earlier this year the Executive discussed and accepted a proposal from the newly-formed Tropical Biology Association. Briefly, we agreed that the TBA can establish an office within the space presently occupied by the Society at the National Museums of Kenya. In return, the TBA is renovating the entire office space and will provide the Society access to its office equipment. As I speak the renovation work is well advanced, and our barn-like main room has been converted into an EANHS business office, a meeting room and a picture gallery. The store-room at the back now contains an office for the TBA and space for BirdLife Kenya and the Kenya Wetlands Working Group, which will now move their secretariats out of the National Museums' Department of Ornithology. Eighty-plus years' worth of Society effects, including a considerable amount of what can only be termed junk, has been displaced, and the confusion is still considerable, but the end result should be a much brighter, more efficient and coherent office. In addition, the Society (combining forces with KWWG and BirdLife Kenya) has agreed to employ a professional Projects Coordinator, who will also work for the TBA. The post has been advertised and we hope to appoint someone very soon. This is a major step forwards that should considerably improve the administration of the Society and our capacity to handle projects.

May I close by thanking our Vice-chairman, Richard Bagine, and the entire Executive Committee for their support and help over the last year. The Executive Committee that you will elect today has a challenging and exciting year ahead of it; I am sure that it can count on the active participation and support of you all.

Thank you.

Articles and Notes

THE OBSCURE CAVE-FLY FROM KENYA

Although they may not be the most conspicuous insects, members of the order Diptera (flies, midges and mosquitoes) can be found in all kinds of colours and forms. they range from the minute and tender gall midges, hardly visible to the naked eye, to the large and robust robberflies of the genus *Hyperechia*, imitating carpenter bees, and from dull and drably coloured houseflies to bright and conspicuously coloured hoverflies. Equally varied is their life history. Any imaginable niche has been occupied by them, whether it be as parasites or predators, phytophagous or saprophagous. One of the more peculiar groups regarding life history and body structure are the Pupipara. These flies are parasites of birds or mammals from which they suck blood. They are called Pupipara because the adult females don't lay eggs but give birth to pupae. The body is usually strongly modified for their parasitic way of life: wings reduced or absent, body strongly flattened dorso-ventrally, legs with long curved claws and the mouthparts adapted for blood sucking (Oldroyd, 1964).

A very strange fly living in association with bats is known from Kenya. In the thirties, the Commonwealth Institute of Entomology received a few specimens of a peculiar fly, found in a cave at Ukazzi Hill (Garissa District) in Kenya (Austen, 1936). The specimens were described as a new species by Ernest Austen and he even erected a new family to incorporate the species: *Mormotomyia hirsuta* in the family Mormotomyiidae. After that first discovery, the species was apparently only found once more. This by V.G.L. van Someren who visited the type locality in 1948 and who found numerous specimens of the species including juvenile stages like larvae and pupae (van Emden, 1950).

Mormotomyia hirsuta is a fairly large fly, measuring 10–15 mm. The first thing one notices about the fly are the long slender legs and the whole body being covered with long rufous fluffy hairs. Other peculiar characteristics are the strongly reduced wings and the reduced compound eyes (Fig. 1). These latter characteristics may be adaptations to a cave dwelling existence. In general the fly has a somewhat woolly and spiderlike appearance. Regarding the biology, not much is known. The species was found in a cleft in a large boulder on the Ukazzi Hill. The cleft was inhabited by bats but attempts by van Someren to shoot some down only resulted in falling stones (van Emden, 1950). The larvae seem to be associated with bat dung and are most likely coprophagous. The adult mouthparts are not adapted for blood-sucking but rather for taking up liquid or semi-liquid matter. When van Someren let one of them crawl on his hand they "seemed to be interested only in surface sweat" (van Emden, 1950).

Unfortunately, not much more is known about this obscure fly and since the expedition of van Someren, nearly fifty years ago, *Mormotomyia hirsuta* has not been reported. The species is not reported from any other locality nor has any related species been found. Pupipara usually know a fairly widespread distribution because of their parasitic way of life. Most of the time they are attached to the body of their host and can be dispersed like that. This is not necessarily the case with *Mormotomyia hirsuta*. Although there seems to be an association between the bat and the fly it is probably not a host-parasite relationship. Also it is not clear how long they stay attached to the bat's body. This may explain the limited distribution of the species.

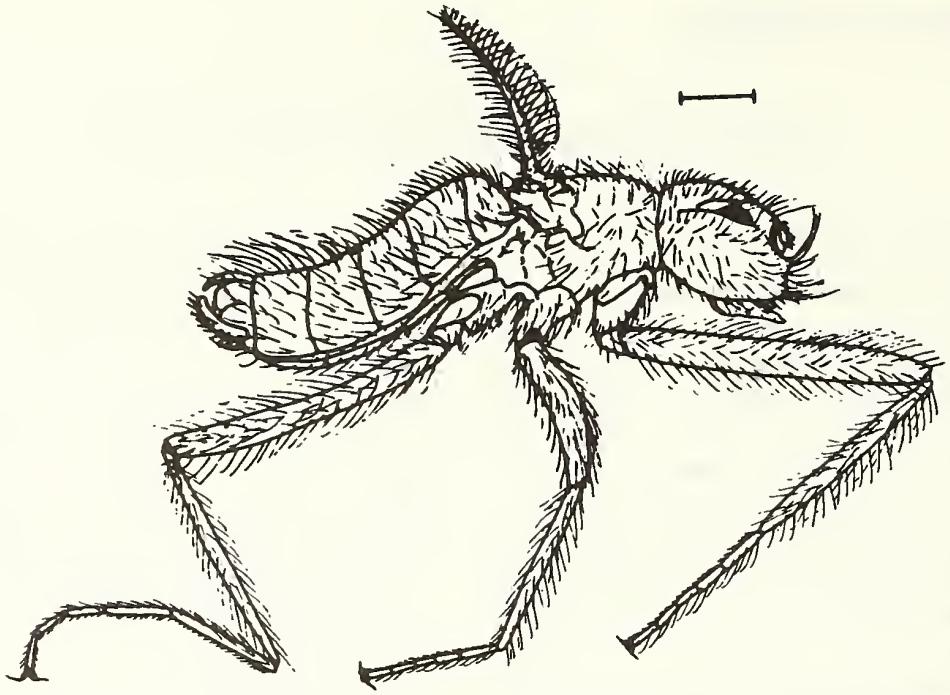

Fig. 1. *Mormotomyia hirsuta*, male lateral view (scale line = 1mm)

A similar case is found in Finland where a species, *Chiropteromyzida wegelii,* was only found once in a bat roost (Griffiths, 1972). The two species are however not related. As a matter of fact the exact systematic position of Mormotomyiidae is not well known. Austen (1936) suggested a relationship with Sphaeroceridae. Others put them under the Calyptrata or as a sister-group of the latter (Pont, 1980). Griffiths (1972) rejects this position and places the family in the Tephritoinea. The evidence present however, still seems to be limited and their taxonomic position is still unclear.

The unique position and the scarce information we have about this fly makes it the more an interesting study object. So many questions remain unanswered. Therefore any additional information would be welcome. Anyone who is a regular visitor of caves and who thinks they have any records of this fly is invited to contact the author of this article. I will be most willing to identify any fly specimens that are suspected to be this most curious but obscure cave fly.

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MEDICINAL WILDLIFE OF SOY SETTLEMENT SCHEME, ELDORET

Most Africans recognize the curative value of plants, wild animals and their by-products in physical and mental illness and antenatal care. In rural areas, where access to hospital is difficult or non-existent, people rely on traditional medicine based on plants and animals products.

The following lists contain the medicinal wildlife (their local names, parts used, drug preparation, diseases cured and problems to survival), used by the local community at Soy.

In the following lists, the first name given is the common name, then follows the scientific name and the Nandi name. The parts used , methods of drug preparation and body parts cured are given next, and the conservation status of the plant or animal.

ANIMALS OF MEDICINAL VALUE

Swifts. *Apus* sp. Kibiswet. The whole body is burnt, and applied in weak joints. Swifts are abundant, and there is probably no problem for their survival.

Swallows. *Hirundo* sp. Kibiswet. Fat melted and applied on itchy scars. These birds are abundant and there is probably no threat to their survival.

Rock Hyrax. *Procavia capensis.* Keneriet. Whole body burnt and eaten as a remedy for cough and common cold. This species is common in rocky, scrub-covered places.

Antelopes. Kenyelet. Droppings are soaked and taken as a remedy for stomach pains. Antelopes are overhunted and most of their habitats destroyed.

Helmeted guineafowl. *Numida meleagris.* Terkekiet. Whole body is boiled and eaten as remedy for headache. Clearance of habitats for farms and continuous disturbances are a threat in this area, though this species is locally common.

Mole Rat. *Tachyoryctes spendens.* Bangunguet. Skin is burnt and taken as a remedy for continuous cough. Mole rats are abundant.

Python. *Python* sp. Kipchuseit. Fat melted and used in witchcraft to chase away evil spirits. Pythons are relatively common in river valleys, though often persecuted by herdsmen for their frequent attack on goats and sheep.

Porcupine. *Hystrix* sp. Chesuer. The meat is boiled and smeared on weak joints. Relatively common, though killed as a delicacy for some families.

PLANTS OF MEDICINAL VALUE

Cyphostemma sp. Simet. Leaves soaked and smeared on itchy rashes. Abundant and there is no immediate threat to their survival.

Ficus punisla. Siriotwet. Leaves and bark boiled and taken for the treatment of headache. This tree is cut down for fuelwood and timber, their numbers are declining fast.

Albizia sp. Seet. Roots boiled and taken in case of tonsilitis. Most of them have been cut down for timber.

Ricinus communis. Maniat. The roots are chewed or boiled to kill worms and as appetiser. The stem is pounded and juice drunk for treatment of stomachache and diarrhoea. The seeds are crushed and mixed with water for treatment of abdominal pains. This shrub is still abundant.

Prunus africana. Chebokukula. Roots are soaked for treatment of poliomytis, leaves are pounded and inhaled for fever, and the bark pounded and mixed with water as a remedy for stomachache. Most of it is now cleared for they provide good-quality wood.

Jusrium flurinence. Kaboron. Leaves are boiled and taken as remedy for headache. Relatively common.

Tragia sp. Chemlit. Roots are boiled and given to children for fever. A common plant.

Flacourtia sp. Kaboroon. Leaves are boiled and used for treatment of stomachache. Still abundant.

Bryophyllum sp. Chepmagura. Roots are boiled and taken to relieve stomachache. Still abundant

Plectranthus sp. Paiyuataret. Leaves chewed as remedy for stomachache. This is a common plant on roadsides.

Diospyros sp. Cheptenderet. Roots are burnt and licked in case of tonsilitis. Common in riverine forest.

Rubia sp. Chesleliet. Leaves burnt and licked for cough, fever and headache. Common plant.

Waltheria monotritha. Chepsita. Leaves are boiled and taken to stop diarrhoea. Common shrub on roadsides.

Plectranthus sp. Ngoriakiblelech. Leaves are burnt and licked as a remedy for cough. Common in fallow land and open areas.

Sida sp. Kerundut. Roots are boiled and given to children for stomachache relief. Common plant

Dactyliandra nigrosus. Chemelet. Leaves are boiled and taken to stop diarrhoea. This climber plant is common along fences and bushes.

Fagaropsis sp. Kikoskosit. Roots are boiled and taken for the treatment of chest pains. Abundant along the riverine bushes.

Plectrathus sp. Ngechwptiat. Leaves are soaked to induce diarrhoea when stomach pain persists. This is an abundant weed on farms

Plectrathus sp. Irokiet. Roots are boiled as a remedy against malaria and headache. Common shrub in fallow land.

Rhus sp. Ketemwe. Roots are boiled for abdominal pains and indigestion. Cut down as it provides slow burning firewood and charcoal. Their numbers are declining.

Melia volkensi. Tildit. Bark is boiled as a cure for general body pain. This tree is threatened by clearance as it provides strong and durable timber.

Vernonia sp. Chasngetit. Leaves and roots are burnt and applied on fresh wounds. Has declined due to clearance for firewood

Asparagus sp. Cheabajiet. Roots are boiled for stomach problems. Common plant

Rhoicissus triedentata. Chepkorotuet. Roots are chewed to ease indigestion. Abundant plant.

Orthosiphen sp. Ngorasawe. Roots are chewed to stop diarrhoea. Abundant plant.

Phyllanthus sp. Turmanyat. Roots are boiled for headache. Is becoming scarce due to continuous cutting.

Casia fistula. Seletwet. Roots and leaves are boiled as stomachache remedy. Abundant plant.

Olea sp. Usuet. Bark is pounded and soaked and taken for de-worming. Provide valuable timber, so they have declined.

Entandophragma bussei. Kogurgwet. Bark is boiled and taken as a cure for chest pains. Most of it has been cut for timber.

Grewia sp. Chepkerelloo. Roots are boiled and taken as remedy for stomachache and pain in lower abdomen. Common in patches of bushes.

Aloe sp. Tungrumet. Leaves are boiled and taken to induce vomiting to cure stomachache and malaria. Abundant plant on rocky ground next to rivers.

Acacia hockii. Talatiliet. Bark is boiled as stomachache remedy. Abundant near rivers.

Vernonia amygdalina. Tebenguiti. Roots boiled and given to children suffering from intestinal worms. Common on bushes and fence lines.

Croton megalocarpus. Musinetiat. Bark soaked and taken as remedy for intestinal worms. Abundant along riverine vegetation

CONCLUSION

The art of native medicine is still strong, the people still rely on traditional medicine based on plants and animal products, though the use of plant products is more common than the use of animal products.

Given the rate at which wildlife is being over-exploited and habitat destroyed to open up agricultural land, it is a matter of concern that future generations might not enjoy the art of native medicine. Planting of trees should be encouraged and organized following the analysis of vegetation types, especially those species used by the local community. Tree species of multiple uses such as medicine and other alternative products such as wood production should be included in forest management planning, research into the identification of such multiple purpose species should be done. People should be encouraged to scatter the seeds of any mature plants they pick.

ACKNOWLEDGMENTS

I am grateful to the staff of the Wildlife Department of Moi University for technical assistance. I wish to thank the late Professor Mtoto Mwema for his help in identification of most plant samples collected from the field. Finally I thank the community of Soy Settlement Scheme for their cooperation in giving me information.

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NOTES ON SECONDARY MONTANE FORESTS IN EASTERN TANZANIA

Moist forests on east facing slopes of the ancient crystalline mountains in eastern Tanzania (the Eastern Arc Mountains of Lovett, 1986, 1990) are remarkable for the high degree of species and generic endemism that they contain (Polhill, 1968). However, certain high altitude forests on these mountains are relatively poor in tree species, and those species which do occur are widespread in the afromontane region (of White, 1983). Two examples are parts of forests at Mufindi in the southern Udzungwa Mountains (08°35'S, 35°15'E; altitude 1,800 m; rainfall 1,600 mm/year) and those at Ukwiva in the Rubeho Mountains (07°20'S, 36° 35'E; altitude 1,600–1,700 m; rainfall not recorded but probably around 1,600 mm/year). A preliminary list of tree species observed at Mufindi and Ukwiva is given in table 1.

In other Mufindi forests, notably those of the Kigogo Forest Reserve (08°40'S, 35°15'E) and Luisenga Stream (08°36'S, 35°18'E) there are a number of plant species of restricted distribution. Examples include *Aframomum laxiflorum, Afrothismia insighins, Allanblackia stuhlmannii, Bersama rosea, Oxyanthus lepidus* ssp *kigogensis, Psychotria megalopus, Stolzia christopheri,* and *Stolzia leedalii* which are found in the Kigogo and *Eugenia* sp. nov., *Hickela* sp. aff. *madagascariensis,* and *Trichocladus goetzi* which are found on the Luisenga Stream. Similarly, Mangalisa Forest (07°10'S, 36° 25'E) in the Rubeho Mountains near Ukwiva contains interesting species such as *Tinnea veesiculosa* and *Zimmermannia stipularis* (Lovett & Congdon, 1989). These forests are more typical of the endemic rich Eastern Arc type.

Greenway (1973) observed that forests at Mufindi and nearby Dabaga (08°05'S, 35° 56'E) showed "...almost everywhere, past cultivation in the form of crop ridges and

furrows when the forest floor herbage is removed". On a recent visit to Ukwiva, numerous pot shards and spoil pits for house building were observed in the forest (Lovett & Minja, 1990). Other forest areas on the Livingstone Mountains near Uwemba (09°28'S, 34°46'E) have a similar species composition and structure to those at Mufindi and so may also cover evidence of previous cultivation and habitation. Upland plateau areas of the Eastern Arc Mountains are very suitable for a settled agricultural population as they have a reasonably reliable rainfall and at an altitude of 1,600–2,000 m are well above the main malarial zone. Outside the forests, soils tend to be highly leached and so rather poor, whereas forest soil is rich in organic matter and fertile. Consequently the forest land is preferred for agriculture, a practice which is continued to the present day by clearance of upland forest for tea plantation.

The people living adjacent to Ukwiva Forest say that they are of the Wahehe tribe who fled from Iringa Town following the German attack on, and break-up of, the Hehe Kingdom from 1894 to 1896. Apparently Ukwiva was forested at that time, and they attributed the pot shards to occupancy by the Wakwiva whom they say had long since left. Immediately to the north of Ukwiva, forest on the Ukaguru Mountains (06°25'S, 36°50' E) reserved by the German administration in the early part of this century, is also secondary (Parry, 1962). Iliffe (1979) reports that a visitor to the coast in 1776 was told that small pox existed throughout the south of present day Tanzania, and it is possible that an epidemic of this nature resulted in the loss of population and subsequent forest regrowth. With the exception of *Bridelia brideliifolia* which is cut at Mufindi for furniture grade timber under the local name *muhape,* none of the species listed in table 1 are of economic importance. Species of commercial interest that should occur in these forests, and which

TABLE 1. Tree species observed in secondary forest at Mufindi and Ukwiva

Species	M	U
Arecaceae		
Phoenix reclinata	+	
Araliaceae		
Cussonia spicata	+	+
Polyscias fulva	+	+
Celastraceae		
Catha edulis	+	+
Maytenus acuminata	+	+
Chrysobalanceae		
Parinari excelsa	+	+
Ebenaceae		
Diospyros whyteana	+	+
Ericaceae		
Agauria salicifolia	+	+
Euphorbiaceae		
Bridelia brideliifolia	+	
Bridelia micrantha	+	+
Neoboutonia macrocalyx	+	
Macaranga kilimandscharica	+	+
Flacourtiaceae		
Alphloia theiformis	+	+
Loganiaceae		
Nuxia congesta	+	+
Monimiaceae		
Xymalos monospora	+	+
Moraceae		
Ficus sp.	+	
Myrsinaceae		
Maesa lanceolata	+	+
Rapanea melanophloeos	+	+
Rhizophoraceae		
Cassipourea gummiflua	+	
Scrophulariaceae		
Halleria lucida	+	+

do occur in some parts of Mufindi and at Mangalisa, are *Ocotea usambarensis* and *Podocarpus latifolius*. Thus in over 100 years of natural regeneration following cultivation, the forests contain little of economic or conservation interest, despite the presence of suitable seed sources nearby. Old pit-saw sites also show a lack of diversity in comparison to the immediately surrounding forests.

At Shume-Magamba (04°40'S 38°15'E, altitude 1,900 m) in the West Usambara mountains a pit-saw site resulting from the cutting of *Ocotea usambarensis* estimated to be between 40 and 50 years old only contained pole regeneration of the pioneer *Macaranga kilimandscharica*. In the Nguru South Forest (06°00'S, 37°30'E; altitude 1,200 m) a similarly aged pit-saw site resulting from cutting for *Khaya anthotheca* (formerly *Khaya nyasica*) contained only pole regeneration of the pioneer *Cylicomorpha parviflora* (Lovett & Thomas, 1988). In the Kigogo Forest Reserve pit-saw sites resulting from cutting for *Khaya anthotheca* in the 1950s and early 1960s contain only *Neoboutonia macrocalyx* regeneration 10–15 m tall, and a sward of 3 m tall *Mimulopsis*. All sites are located in the midst of species-rich forest. Thus small gaps created by pit-sawing only contain pioneer species of no commercial value after 30 to 50 years natural regeneration.

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BUTTERFLIES TRAPPED IN MILKWEED FLOWERS IN KENYA

Observations on the trapping of butterflies by plants go back over a hundred years (Giard, 1894). Saunders (1900) and Gahan (1900) reported a specimen of butterfly, *Pieris rapae* (Pieridae) and of a moth, *Plusia gamma* (Noctuidae), both European species, caught by their proboscis in the flower of Brazilian garden plant called 'moth catcher', *Araujia sericifera*, then called *A. albiens* (Asclepiadaceae). They investigated the nature of the entrapment mechanisms and pointed out that the textbook statement, that insects were only captured by *A. sericifera* in countries where this plant was introduced and foreign, was wrong. A case had been exhibited from Buenos Aires where the plant is indigenous and the subject had been investigated in France (Marchand & Bonjour, 1899).

A. sericifera has white flowers and the nectaries are situated under the anthers in a position that traps the proboscis as it searches for nectar. If the insect is not strong enough to free itself, its proboscis is stuck in the flower, and it dies. But if it manages to free itself, it takes away the pollinia and can pollinate other flowers. Entrapment has been recorded in the tropics as well as in temperate countries where the plant is cultivated. In France, the freeing needs more power because the flowers do not reach absolute maturity.

In most plants catching the insects the nectaries are placed in such a way that the proboscis is introduced from below to above and when pinched, can only be freed by a great force. The least effort makes the proboscis go upwards where the opening is even narrower. In asclepiads, the pollinia are on top of the opening and if the insect manages to free its proboscis, the pollinia will be found attached to it. However, entrapment is not restricted to asclepiads as table 1, taken from Giard (1894), shows.

Saunders and Gahan (1900) concluded that the insects were captured only by immature flowers, the anther wings in the cleft in which the proboscis of the insect is caught being at that time stiff and resistant. When the flowers are mature, the anther wings are less rigid and do not offer sufficient resistance to withdrawal of the proboscis, which carries with it the pollinia ready to be transferred to the stigma of the next flower visited by the insect.

Observation

Collectors of herbarium specimens always look for a plant with flowers or fruits. On 15th December 1984, at 1 pm on Masumbi Hill in the Kora National Reserve, I was attracted from afar by the white and brown colours that covered a whole plant. On approach, I found that these were not flowers

Figure 1: a captive butterfly (life size)

or fruits, but butterflies. The plant, a specimen of *Cynanchum hastifolium*, had about six branches, each with about thirty flowers. At each node, there were six flowers, all at different stages of maturity. A total of thirty butterflies of both sexes, all *Belenois creona*, were found caught by the

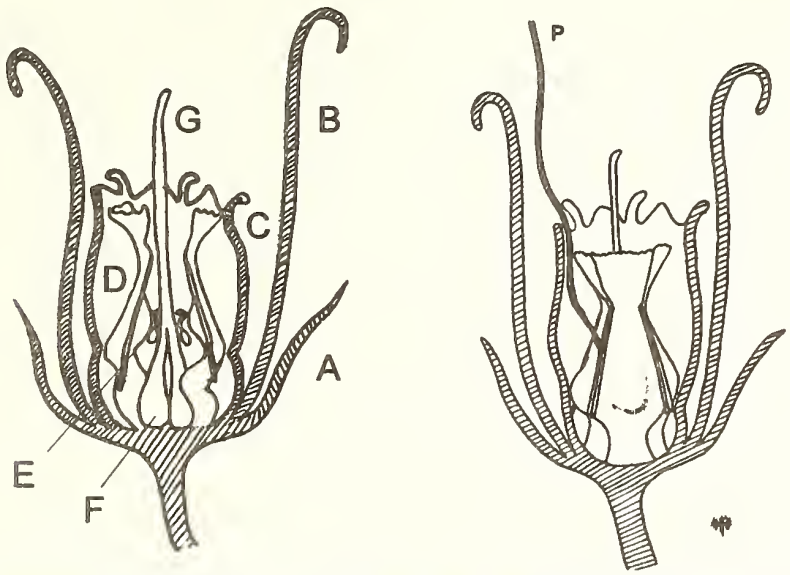

Figure 2: diagrams of the flowers of *Cynanchum hastifolium* (x 10). In the left diagram, one of the corona lobes is removed to show the internal structures. The right diagram shows the position of the trapped proboscis. A: calyx; B: corolla; C: corona; D: stamen; E: pollinia; F: ovarium; G: style; P: proboscis.

proboscis in the flowers. In some cases, two flowers out of six at the same node had butterflies entrapped. All the butterflies were alive and flapping their wings, trying to release themselves (Fig. 1). When the flower was dissected in order to follow the extent of the proboscis into the flower, it was found to be caught between the slits of the pollen

Table 1: plants reported to have captured insects in their flowers

Species	Family	Native Country	Flowering time
Apocynum andersaemifolia	Apocynaceae	North America	July
A. hypericifolium	Apocynaceae	Canada	July
Araujia sericifolia[2]	Asclepiadaceae	South America[1]	September
Asclepias comuti [3]	Asclepiadaceae	North America	July/Aug.
A. incarnate	Asclepiadaceae	North America	July
A. sullivanti	Asclepiadaceae	North America	Summer
Campanula medium	Campanulaceae	Europe[1]	July
Circium discolor	Compositae	Northern Temperate	?
Kalmia latifolia	Ericaceae	North America	May/June
Kniphora aloides[4]	Liliaceae	South Africa[1]	Aug/Sept
Mandevillea sauveolens	Apocynaceae	Argentina[1]	Summer
Nerium oleander	Apocynaceae	Mediterranean[1]	June/Oct
Oenothera speciosa	Onegraceae	Central America[1]	June
Vincetoxicum offcinale	Asclepiadaceae	Europe	May

Notes with table 1: [1] Cultured in East Africa; [2] Syn. *Araujia albens*; [3] Syn. *Asclepia syriaca*; [4] Syn. *Kniphora uvaria*

Table 2: insects reported captured by plant species (from Giard, 1894)

Species	Family	Native Country
Apis mellifica	Apidae (bee)	Cosmopolitan
Bombus hortorum	Apidae (bee)	European
Macroglossa stellatarum	Sphingidae (moth)	European
Mamestra oleracea	Noctuidae (moth)	European
Nomophila noctuella	Pyralidae (moth)	Cosmopolitan
Pieris brassisae	Pieridae (butterfly)	European
Pieris rapae	Pieridae (butterfly)	European
Plusia chrysitis	Noctuidae (moth)	European
Plusia gamma	Noctuidae (moth)	European
Sphinx convolvuli	Noctuidae (moth)	East African
Xylocarpa violocea	Apidae (bee)	European

carrier (corpusculum) (Fig. 2). The sheath (gynostegum) of the gynoecium where thproboscis was trapped was visible and this suggested that the flowers were mature.

Discussion

This observation raises many questions. How often does *C. haustifolium* trap butterflies? Which species does it trap? How often do the butterflies escape? Are other butterflies of the same species likely to be attracted to a trapped and active one? How does attractiveness and trapping ability vary with the different stages of development of the flower? Do trapped species pollinate without being trapped? An experimental investigation in a large flight cage could help to answer these questions.

It seems most probable that trapping is accidental, although Saunders and Gahan's conclusion that only immature flowers trap suggests an adaptive hypothesis on the part of the plant: trapping prevents the premature removal of unripe pollinia. A weaker, but more plausible adaptive hypothesis is that trapping is a chance by-product of selection for developmental patterns that prevent premature removal of ripe pollinia by limiting access to them when they are not ripe. In the present case, however, the flowers appeared to be mature. There is no evidence that the plant gains any sort of nutrient from the dead insect, but accidental entrapment of this kind could have been a stage in the evolution of truly insectivorous plants.

An unusual feature of the observation reported here is the large number of butterflies trapped by a single plant. *Belenois creona* is a migratory species and was migrating in large numbers at the time of the observation. The large number of butterflies trapped no doubt reflects the number of butterflies involved in the migration and because they attract one another to desirable resources. *B. creona* is a well known migrant and it congregates on mud puddles and in large communal roosts (Larsen, 1992).

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Field Trip Report

A TRIP TO THE MOUNTAIN GORILLAS: A NATURALIST'S PERSPECTIVE

For most people who visit the Volcanoes National Park in Rwanda the sighting of the endangered mountain gorilla (*Gorilla gorilla beringei*) is the climax of the trip. It is the main reason for their journey and the justification for the money spent and the energy expended.

However, for the observant visitor with an interest in natural history the journey to and from the gorillas is full of exciting surprises. The terrain alone is of interest—volcanic lava in which there are seams of reddish-brown iron and where obsidian and other minerals may be found. The cultivated and populated areas give an insight into the way local people live: their attractive little thatched houses, their large-horned cattle and tethered goats, potatoes, beans and pyrethrum. But in these places there are wild species to be seen also: attractive flowers, beetles, chameleons (*Chamaeleo rudis*) and, in pools and boggy areas, tadpoles and toads (*Bufo regularis*).

The sudden transition from tilled land to park is a reminder of how much of the area must once have been covered by forest. To most visitors the plants in the forest appear 'exotic', such as tall bamboos (*Arundinaria alpina*) on the lower slopes and the *Hagenia* and *Hypericum* trees, draped in lichens, that predominate at high altitudes. But some of the vegetation is familiar in that many species closely resemble plants of Europe and North America. Thus, there are plantains, nettles, thristles, goosegrass and brambles, usually different species from those in the northern hemisphere, but with the same appearance and feel. Some flowering plants, although unfamiliar, are readily recognisable as members of certain families, such as the Ranunculaceae and Asteraceae, and there are also grasses, sedges, mosses, ferns (including bracken) and liverworts.

Invertebrates are abundant in the park. In the damper areas harvestmen crawl through the undergrowth: in open spots wolf spiders, some carrying egg cases, run in the sun. The clearing in the forest are also home to butterflies, including skippers (Hesperidae) and blues (Lycaenidae), beetles, flies, and short-horned grasshoppers. Along the forest tracks small dirty-white geometrid moths abound: they fly up as one moves the vegetation. It is interesting to ponder how much is known about their life cycle and how important they and other small insects are in the various food chains. After rain large earthworms, some up to 30 cm in length, are to be seen on the path. These creatures are pink, like their temperate counterparts, while the worms that frequent open cultivated areas at lower altitudes are heavily pigmented—presumably to protect them against ultraviolet radiation.

But it is not just the plants and the small invertebrates that catch the eye. There is

ample evidence along the forest paths of mammals: buffaloes, small antelopes, porcupines and monkeys. The droppings and tracks of these animals are generally characteristic and the park guides can usually not only identify them but state accurately how long ago the individual passed by. The monkey in the park is the golden (*Cercopithecus mitis kandtii*), an attractive subspecies of the blue monkey. From time to time these primates are seen but more often only their sharp cry is heard and there may be evidence of their presence in the form of chewed bamboo and other plants. Higher in the forest, where *Hagenia* and *Hypericum* trees and tall *Lobelia* abound, tree hyraxes (*Dendrohyrax arboreus*) are common: these strange creatures, distant relatives of the elephant, run and climb silently by day but at night produce a cacophony of eerie and unusual sounds.

Most visitors to the park will consider the sight of the mountain gorilla to be their just reward for a walk, sometimes an arduous climb, in the forest. Nevertheless, the other animals and plants in this reserve are of great interest. At a time when biodiversity is the new clarion call of conservationists the richness and variety of the Volcanoes National Park must not be overlooked. Much remains to be learned about it.

More information about the wild life of the Volcanoes National Park can be found in: Hinkel, H. and Fischer, E. (1988). *Reptiles et Amphibians du Rwanda et leurs environment.* Bureau de change Co-ordination, Kigali, Rwanda.

Information about the Volcano Veterinary Centre and its work is available from the Morris Animal Foundation, 45 Inverness Drive East, Eaglewood, Colorado 80112-5480, USA.

John and Margaret Cooper, Centre Veterinaire des Volcans, B.P. 105, Ruhengeri, Rwanda.

Since the above was written, the situation in Rwanda changed dramatically. The authors of the above article sent a letter to the editor, relating their experiences after the outbreak of the civil war. This letter is reproduced here:

'We were evacuated from the Volcanoes Veterinary Center (VVC) in Rwanda on Saturday 9th April and arrived in Britain six days later via Zaire, Burundi and Kenya. Our departure was not as traumatic as that of many others who left Rwanda; nevertheless, it had its difficult, dangerous and distressing moments. We fear for the safety and security of our African friends and staff.

We are remaining in Britain for the time being and maintaining close contact with the Morris Animal Foundation in Colorado USA, who established and fund the VVC and it work. We have reason to believe that the VVC may still be intact and that some of the staff are still there; we intend to return to Rwanda at the earliest possible opportunity and in the meantime are involved in various activities relating to the Center and the Morris Animal Foundation.

Insofar as the Volcanoes National Park is concerned, the Foundation has issued a press statement. Our belief is that while there is no immediate threat to the gorillas and the other wildlife for which the VVC is responsible, this situation could easily change, particularly in the aftermath of the war. At that stage local people are likely to need food and building materials and the forest could be put under considerable pressure. A concerted programme will be needed in order to help both the human population and the National Park.

For further information, including copies of press releases, we can be contacted at: The Durrell Institute of Conservation and Ecology, University of Canterbury, Kent, CT2 7NX, UK, or through the Morris Animal Foundation at the address given above.

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Articles and Notes

AN INTRODUCTION TO THE BRYOPHYTES FROM MOUNT KENYA

Mt Kenya, situated on the equator and reaching 5,199 m asl, shows an altitudinal zonation of distribution of higher as well as lower plants. This distribution of vegetation is influenced by climatic factors of rainfall, temperature and altitude with additional microhabitat determinants for bryophytes, which includes the frequency of cloud and mist on the mountain, the humidity of the air and the length of the dry periods. Species diversity and life forms are greatest in the montane forest, where climate conditions are favourable, this diversity decreasing with altitude until the summit area which supports small cushions of moss species on rock surfaces and crevices.

In 1932, the Mt Kenya Forest Reserve was established, consisting of an estimated 2,095 km². It extends from about 1,700 m to 3,300 m, although the lower boundary of the forest is no longer detectable owing to numerous farms on the foothills of the mountain. The area of the forest reserve is estimated to represent 25% of all remaining indigenous forests of Kenya. In 1949, Mt Kenya National Park was established to include all areas above 3,200 m and in addition, two narrow salients which reach down to 2,450 m, so that the total surface area of the park is estimated to be 718 km².

About 160 km to the north-east of Nairobi, Mt Kenya is situated on the equator and has an estimated base diameter of 120 km. Formed about three million years ago, it is an impressive volcanic mountain of Vesuvian type, standing above an immense plateau averaging 2,000 m asl. Three main peaks dominate the summit region: Batian, 5,199 m; Nelion, 5,185 m, and Lenana, 4,985 m. In this summit area water is locked in ice and snow and the melting of these trickles down slowly giving rise to the numerous streams that flow down in a radial pattern carving deep valleys on their way down to form the two very important river systems, the Uaso Ngiro and the Tana. Countless farms found at lower altitudes extract the waters of the mountain to irrigate their fields.

Many secondary craters and crater lakes like Kirui, Ithanguni, Mugi Hill, Giant's Billiard Table and Rutundu, located on its lower slopes, indicate that eruptions took place in more recent times. Numerous glaciers were still to be seen at the beginning of this century but today, an important number of these have receded, and only 12 small glaciers remain. It has been estimated that forty years from now even the largest glacier—the Lewis Glacier—will have disappeared completely.

The climate of the mountain is influenced by the Tropical Easterly Wind Belt. The 'long' rains occur in March and the 'short' rains in October, following the equinoxes. Cold and dry climatic conditions are experienced between end of June and mid October while hot and dry conditions occur between mid December and mid March. The southern and eastern slopes receive the highest rainfall as they face the rain bearing winds, while the northern and western slopes, being in the rain shadow, receive the lowest rainfall. Annual precipitation figures are in the region of 2,500 to 2,700 mm for the wetter southern and eastern slopes at 3,000 m asl and 700 to 1,000 mm for the drier western and northern slopes at a similar altitude. Above 3,000 m asl rainfall decreases as

altitude increases so that the peak area receives about 700 mm per annum. Considerable amounts of snow falls in the peak region throughout the year and abundant snow collects below the peaks to about 4,400 m asl in the northern face when the sun is in the southern hemisphere and vice-versa.

Owing to its equatorial position, a fairly constant day and night duration of twelve hours is experienced with large diurnal temperature fluctuations of 15 to 20°C. Frosts are common above 3,000 m.

The distribution of vegetation is influenced by climatic factors of rainfall, temperature and altitude. The vegetation shows an altitudinal zonation from submontane to montane forests (1,700–3,000 m), to 'mossy' forests (3,000–3,300 m) to ericaceous woodland (3,300–3,800 m) which eventually give rise to giant groundsels (3,800 m and above) scrubland up to 4,500 m asl where phanerogams are absent except in very sheltered places, but where mosses and lichens are commonly present on the rock boulders found at this altitude.

In addition to the above climatic factors, the distribution of bryophytes is also influenced by the frequency of cloud and mist on the mountain, the humidity of the air and the length of the dry periods or the number of humid months. Some species of bryophytes that are moisture demanding are found to extend into caves, river gorges and other sheltered sites.

The permanently humid submontane, montane and 'mossy' forests form a continuous ring around the lower slopes of the mountain between about 1,700 and 3,300 m asl. They provide favourable conditions for the growth of tall forest trees, shrubs, herbs and support a wide variety of epiphytes, mosses, liverworts, algae, lichens and ferns. About 10% of these forests are exploitable timber trees. The indigenous trees that are commercially exploited are *Vitex keniensis* (Meru Oak), *Juniperus procera* (Pencil Cedar), *Podocarpus gracilior, Ocotea usambarensis* (Camphor), and the Olive, *Olea capensis* ssp *hochstetteri* and *Olea europaea* ssp *africana.* Under the canopy of the tall trees where sunlight penetrates as sun flecks we find a profusion of bryophytes presenting a wide diversity of growth forms. Many are terrestrial, growing on the ground, by stream banks, on boggy areas; some grow on dead wood, rocks and boulders, on rocky outcrops or in rock crevices; others are found as epiphytes on trunks, branches, twigs and leaves of forest trees, shrubs, bamboo, tree ferns and giant groundsels.

Epiphytic bryophytes are abundant on the lower parts of trunks, particularly where the bark is rough and where the humidity is high. *Porotrichum molliculum, Porothamnium stipitatum, Porella hoehnelii, Leptodon smithii, Neckera platyantha* and *Plagiochilas* display beautiful 'fronds' from the trunks, while *Radula recurvifolia,* and *Lejeunea* spp form creeping mats over the surface of bark. Parts of trees and branches that fall to the ground are found with the epiphytic bryophytes on them but these are slowly replaced by others when the dead wood rots. These lignicolous bryophytes often include *Hypopterygium viridissimum, Leucobryum viridissimum* var *molle* and several species of *Sematophyllum.* Terrestrial bryophytes are less abundant due to a fair amount of leaf litter on the ground, but along forest margins, the terrestrial *Bryum preussii* and *Rhodobryum perspinidens* grow in abundance on the humid ground. Exposed wet stones and rocks on the ground provide a substrate for rupicolous species of *Fissidens.* Along streams and rivers in these forests, thalloid bryophytes of *Marchantia polymorpha, Lunularia cruciata, Asterella linearis, Anthoceros myriandroecius, Dumortiera hirsuta* and dendroid forms of *Symphogyna podophylla, Pallavicinia serrata* abound on the wet ground. Where light is abundant, most shrubs in the montane forests have hanging or pendant mosses of *Pilotrichella cuspidata* and *Papillaria*

africana. These have stems that creep on the twigs and these stems eventually produce long secondary stems (that hang down) which in turn produce short tertiary branches of limited growth. The hanging mosses sometimes reach half a metre long.

In the mountain bamboo (*Arundinaria alpina*) belt, between 2,400 and 3,100 m, the ground is practically bare of bryophytes. However, *Neckera platyantha, Atractylocarpus alticaulis, Pilotrichella cuspidata, Radula recurvifolia* and several species of *Plagiochila* grow on the nodes of the bamboo stems.

On exposed ridges in the upper montane belt where *Hagenia abyssinica* is the dominant tree species, huge cushions of *Antitrichia kilimandscharica* which cover the big branches are conspicuous; this abundance of big cushions of bryophytes is due to the frequency of cloud and mist, creating long wet periods. Sometimes these mosses are so moisture-laden that they fall to the ground due to their weight.

Disturbed areas on the mountain are numerous. These are the road cuttings, man-made paths up the mountain, burnt areas as a result of man-made or natural fires. In these areas acrocarpous mosses are abundant, *Funaria hygrometrica* on disturbed soils, *Polytrichum commune, Polytrichum piliferum, Pogonatum gracilifolium, Pogonatum perichaetiale* ssp *oligodus* on vertical faces of road-cuts. Various other mosses grow intermingled taking advantage of exposed ground beside road-cuts, like weft forms of *Thuidium matarumense, Hypnum cupressiforme, Hylocomium splendens,* growing among tall tufts of. *Breutelia stuhlmanii, Breutelia gnaphalea* etc.

Above the tree line at 3,300 m the vegetation becomes more open, consisting of *Erica arborea* woodland. Bushes of this giant heather predominate the landscape up to 3,800 m asl, especially on the ridges. On the twigs and branches of *Erica arborea,* epiphytic bryophytes predominates, the common mosses are *Macrocoma abyssinica* and *Zygodon intermedius* while among the liverworts are *Frullania arecae, Frullania schimperii, Cheilolejeunea pluriplicata* and *Radula recurvifolia. Dicranum johnstonii* may grow on the ground under the ericaceous bush or epiphytically on its branches.

Campylopus nivalis form extensive short tufts in the ericaceous belt. Other terrestrial bryophytes include *Breutelia stuhlmanii* and *Breutelia gnaphalea* growing among *Hypnum cupressiforme* in the open areas while on rock outcrops in this belt are tall tufts of *Herbertus dicrana, Racocarpus purpurascens,* and *Chandonanthus hirtellus.* Under these rock outcrops the moisture loving *Metzgeria* spp may be found. On the surfaces of numerous rock boulders present in the upper ericaceous belt and throughout the alpine region thrive drought resistant *Racomitrium subsecundum* and *Grimmia affinis* with their hyaline hair points. *Orthotrichum rupestre* too, is a common rupicolous species on these rocks.

There are also acidic substrates on the mountain, particularly in the so called 'vertical bog' situated between 3,350 m and 3,600 m asl where extensive tall tufts of *Sphagnum davidii* grows on these almost permanently wet ground.

The alpine as well as the nival zone (above 4,500 m) present harsh climatic conditions where it is hot during the day and the temperature often drop below zero during the night giving a daily diurnal temperature difference of 15 to 20°C. The ground is often frozen during the early hours of the morning and at certain short periods during the year, the ground is covered with snow. Extensive tall tufts of *Aulacomium turgidium* are present on the very wet ground and are often found in great masses growing from the water's edge into the water at the tarns; tall tufts of *Tortula cavallii* are commonly seen growing on the lower part of branches and forks of *Senecio keniodendron,* the giant groundsels; small round cushions of

Andreaea cucullata and *Grimmia affinis* are commonly found on the rocks boulders at this altitude. Along river and stream banks thrive *Marchantia polymorpha, Lunularia cruciata* and *Scapania africanum, Bartramia ithyphylla* and *Fissidens* sp.

As you move up between 3,850 m and 4,450 m asl, owing to the alternate freezing and thawing conditions, some small cushions of *Grimmia affinis* growing on rock surfaces become detached from the rock and fall on to the ground where solifluction soil conditions promote the transformation of the cushions into 'moss balls' where shoots of *Grimmia affinis* radiate from a central point.

Above 4,700 m, the ground is covered with either permanent ice or snow for either part or the whole year. Rocky outcrops, rock boulders or moraines, and screes are characteristic of this summit region. Harsh climatic conditions are ever present and the bryophytes that survive in the area are small cushions of *Andreaea cucullata* and *Grimmia affinis.* These mosses are also present on the summits of Batian, Nelion and Lenana where they occur with several lichen species.

Min S. Chuah-Petiot, Botany Department, University of Nairobi, Box 14576, Nairobi

WHO WAS ELSA?

Peter Bally, a former botanist in the East African Herbarium and a former Executive Committee member of the East Africa Natural History Society, was Joy Adamson's second husband. He influenced her life in several ways. In particular, he gave her the name Joy, by which she was known for the rest of her life, and by which she will always be remembered. A fine artist himself, Peter also encouraged Joy to develop her talent for painting.

In chapter 5 of his autobiography, George Adamson (1986) states that the famous lioness Elsa was named after Peter Bally's mother. However, the recent biography of the Adamsons by Adrian House (1993) gives a different story. In chapter 15 House claims hat Elsa was named after the mother of Joy's first husband, Victor (Ziebel) von Klarwill. House also says that Joy did not publicise the origin of the name in case she hurt Elsa von Klarwill's feelings, so we are unable to check in Joy's own books. Both books are from the same publisher. So, who was the eponymous Elsa?

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House, A. 1993. *The Great Safari.* Harvill, London.

Leonard E. Newton, Department of Botany, Kenyatta University, P.O. Box 43844, Nairobi.

ESTIMATING NILE CROCODILE NUMBERS ALONG THE ATHI RIVER BORDERING NAIROBI NATIONAL PARK

The Nairobi National Park is situated south the city of Nairobi and is approximately 117 km² in area. This park has numerous dams and rivers that flow in a south-east direction draining into the Athi River. The southern boundary of the Park is bounded by the Athi River which flows along the Park boundary and within the Park.

The River is characterised by long pools, connected by smaller flowing streams,

and in some places there are deep gorges. The river whose length along the park boundary is approximately 30 km long, of which approximately 8 km runs through the Park and the remaining 22 km has the north bank in the park and the south bank borders private land. The various dams and the Athi River contain populations of Nile crocodiles and two methods were used to estimate the populations along a stretch of the river.

METHODS

The Hippo Valley Inn is situated along the southern boundary of the park, at the point where the Sosian Gorge enters the Athi river. This place lies approximately 200 m upstream of the Hippo Pools, and this stretch of river was observed during a nocturnal spotlight count and daytime count.

To conduct the nocturnal spotlight count the river bank was approached as quietly as possible and the river scanned with a five-cell (size D) spotlight. A boat was not used as the river is narrow (approximately 10 m wide) and the thought of coming across a hippo in a 10 m wide river was considered risky. The daytime count was conducted similarly but in this case the river was scanned using 10 x 50 binoculars.

RESULTS

The nocturnal spotlight count was conducted by walking towards the Hippo Pools and approaching the river and working backwards to the campsite. The river was approached near the Hippo Pools and the survey started at 19:40 hrs. This survey was conducted over approximately 2 km of river and only three adult crocodiles were observed near the Hippo Pools. The other part stretching towards the camp site did not reveal any crocodiles. This survey was considered dangerous as we were chased by a hippo near the Hippo Pools and a hyena caused some concern as we surprised it along the river.

The daytime survey stretched for 500 m along the river towards the Hippo Pools area. This survey yielded three crocodiles: two sub-adults and one juvenile.

DISCUSSION

The area around Hippo Pools falls within the Park and there is less disturbance from humans and livestock. This is part of the river where three adult crocodiles were observed. The rest of the river upstream contains smaller crocodiles but they are difficult to observe as the population is wary of human presence which is increasing in this area.

According to people who live along this river dead crocodiles are occasionally found without any evident injuries. These deaths could be related to pollution or, more likely, through range constriction. The dead crocodiles have been eaten by the local residents of this area so death through pollution does not seem likely, as the people have not suffered any ill effects. The deaths could be stress-related or through lack of suitable prey as they are forced to live in the shallower parts of the river, where human disturbance and lack of suitable prey could have an effect on the crocodiles.

Another factor that could contribute to the decline of the crocodile population is the drying up of the seasonal rivers—which hardly hold any water due to cutting of the riverine forest—and the general drying up of the climate. This would result in a lack of suitable habitat for hatchlings who have to compete for space in the narrow river. The construction of a suitable weir upstream of the Kitengela Corridor can create a large man-made lake that can benefit the crocodile population by providing it with a larger, more suitable habitat. This water resource can be used both by livestock and wildlife for watering and provide a wider barrier between the Park and private land.

Pritpal S. Soorae, P.O. Box 44919, Nairobi.

DIDRIC CUCKOO BEING FED BY LITTLE RUSH WARBLERS

At Fisi Dam in the Nairobi National Park on 11th August, 1994, we enjoyed amongst other pleasures an interesting experience involving a recently fledged Didric Cuckoo.

Perched on the branch of an acacia tree of relatively small stature, closeby the spillway at the end of the dam wall, we were at first attracted by the coral-pink bill and rufous head of the bird. The blue eye, although showing up well later in certain lights, wasn't immediately recognisable. Hopping about the tree the young bird was not disturbed by our vehicle being parked on the opposite side of the track and continued to find caterpillars and other food items amongst the foliage. When the cuckoo was pretty well out of sight to the rear of the tree we glimpsed what we thought might be the passing of food from another bird. At the time we could not observe any detail of the other birds as it was just a shadowy form; however, as there were several Rufous Sparrows about we thought this species may have been the one apparently parasitised. Frustratingly the Didric Cuckoo continued to work the far side of the foliage for food and remained out of our sight for some time.

Meantime our interest was taken by a couple of 'little brown jobs' flying to and fro low over the red-soil track between the reeds bordering the water and the acacia. Not considering ourselves experts, and always willing to accept the challenge of attempting to identify an LBJ, we duly made copious notes to aid us in the study of our numerous bird books later in the day. We suspected that these birds were warblers of the waterside vegetation but were unsure of the actual species. Their plumage appeared worn, the respective tails being quite ragged at the tips. By this time we felt sure that it was this pair of birds feeding the young cuckoo. Identification appeared to be relatively straight forward until we discovered that the chosen species was unlikely to be seen in that sort of habitat, and worse, even in this part of the country! So back to the books and then back to the bird the following day.

Having decided by comparison with the sparrows that the LBJs were 15–16.5 cm in length we were put off one contender because its length was given as 11.5 cm only to discover, later, that for southern and central Africa, at least, several books gave lengths varying from 14–19 cm. Also the colour of the underparts seemed not to agree entirely and the stripe over the eye was discerned only with difficulty, but the habitat and calls did comply with recorded details. After much deliberation it was decided the pair could be no other than Little Rush Warblers (*Bradypterus baboecala*).

Upon our return to the acacia tree the day following our first visit there was no sign of the young bird or its supposed foster parents but after lunch, as on the previous day, the cuckoo was seen and its feeding appeared to commence forthwith. This particular bout of activity again lasted around half an hour during which time we had numerous views of the warblers placing food into the mouth of their foster young. The food, small winged insects and maybe other insects, supplemented by an orange-winged butterfly, was collected both from the reeds and acacia tree as well as from the long grass immediately surrounding the tree and even the surface of the soil forming the vehicle track. It seemed that no local source was being ignored in order to provide a continuing supply of nourishment to the growing bird during this period of activity. In between accepting donated food the young bird plucked insects and several caterpillars from the acacia foliage. At no time did the presence of our vehicle, or the clicking of my

camera, disturb the intensity of feeding.

From the literature available to us no mention is made of warblers fostering Didric Cuckoo nestlings. Among habitats given which include riverine bush and reeds it is on record that some Didric Cuckoos favour papyrus swamps in Central Africa. Only one of our books mentioned the blue eye of the young cuckoo. As mentioned above, however, the blue cannot be seen in all lights and at times the eye can appear virtually colourless.

On the third day the young cuckoo was ranging along the downstream side of the track running the length of the dam wall flying clumsily about the cassia shrubs. The pair of warblers were also seen but not in company with the young bird.

To conclude, our appreciation is due to Bill Harvey for the special visit he made to the dam on the third day of the event and for the important help he gave us with the warbler identification.

Peter Squelch and Wendy Safe-Squelch, P.O. Box 41815, Nairobi

MASSIVE CORAL BLEACHING

The tension between large-scale global warming and coral bleaching events may be on the increase if East Africa turns out to be an early-warning indicator of coral bleaching events in the northern hemisphere. March 1994 is the largest bleaching event that has been observed in the recent decade. Even the heavily reported 1987 world-wide bleaching event was significantly less severe than what may be in store for the 1994 event.

I have been monitoring Kenyan reefs since 1985 and making observations on bleaching intensity. Coral bleaching is most evident in Kenya on the second spring low tides of March when its equatorial position receives the maximum sunlight. East Africa appears to have sprung out of two year stretch of cool weather probably related to the three interacting factors of a low frequency sunspot period, soot and volcanic ash from Mt Pinatubo and the Iraqi War. Recovery of the atmosphere and increasing sunspot intensity may have resulted in a sudden and rapid change in environmental conditions that increased the conditions for bleaching.

Fortunately, bleaching does not result in death except for a small part of the population, particularly recruits, and reefs are recovering. However, bleaching followed by other human influences such as sedimentation and over-fishing are, perhaps, even more hazardous and are also being monitored.

Some bleaching occurs in most years during March. However, during 1987 and 1994 the bleaching was intense enough to be clearly notable. The following table is a 'qualitative' ranking of the intensity of bleaching in Kenyan coral reefs for those years for which observations were made. No information is available for 1989 and 1990.

Rank - Worst Bleaching First	Year
1	1994
2	1987
3	1985
4	1986
5	1988
6	1991
7	1992
8	1993

Tim McClanahan, Associate Research Ecologist, Coral Reef Conservation Project, The Wildlife Conservation Society, P.O. Box 99470, Mombasa

Book Reviews

Orchids of Malawi. The epiphytic and terrestrial orchids from South and East Central Africa. I.F. la Croix, E.A.S. la Croix & T.M. la Croix. ISBN 90 6191 808 1. Pp. x + 358, 276 text figs., 283 text maps, 26 plates (120 colour photographs), 3 loose maps. A.A. Balkema Publishers, P.O. Box 1675, 3000 BR Rotterdam, The Netherlands, 1991. Price: $ 89.00.

We all know the problem of scientific series like the Flora of Tropical East Africa: though comprehensive and scientifically accurate, they are a nightmare to the amateur botanist with their highly technical and specialised language. Others like Blundell's Wild Flowers of East Africa are extremely useful as field guides, but they are far from comprehensive and rely entirely on pictures to find the name of a particular plant. Orchids of Malawi is a book that will be enjoyed by amateur orchidologists and the professional orchid botanist alike. The technical botanical language is simplified, but the treatment of the subject remains highly scientific.

I was wondering how the la Croix family managed to make a book both for the amateur and the professional. As I couldn't find any information on the authors in this book, I had to go back to one of their earlier works to find out something on their background. The dust cover flaps of Malawi Orchids, Volume 1, Epiphytic Orchids, by I.F. la Croix, E.A. S. la Croix, T.M. la Croix, J.A. Hutson and N.G.B. Johnston-Stewart, published in 1983, states that Isobyl is a botanist who graduated from Edinburgh University, while her husband Eric is a professional entomologist, who was stationed in Malawi on a British aid project for a little over ten years. Tom, one of their children also succumbed to the fascination of orchids. Their joint interest in exploring the Malawi countryside for native orchids, and their different training resulted in this magnificent book.

Orchids of Malawi begins with five introductory chapters on climate and geography, orchids in their natural habitats, cultivation, structure and classification. Although not exhaustive on any of the mentioned subjects, these chapters are highly informative. Tucked into a back flap are three maps of Malawi that accompany these introductory chapters. One map has the administrative boundaries and rivers, the second one gives the locations of the forest reserves, national parks and game reserves while a third one gives the rainfall distribution over the country.

Chapter 6 contains the bulk of the book which is a description of the 402 different species of orchids occurring in Malawi. This chapter starts with an excellent key to the different genera. The authors point out that "many people find keys off-putting, but it is just a question of getting used to them". Well, it doesn't take long to get familiar with this key; the use of easily observed characters and readily understood descriptions gives one immediate confidence in tracking down the identity of a particular plant. The key is simple to use and seems to work well, even in the East African context.

The major terrestrial genera treated in the book are *Habenaria* with 80 species and *Eulophia* with 56. In East Africa (Kenya, Tanzania and Uganda), there are 108 species of *Habenaria* and 65 species of *Eulophia.* The biggest genera of epiphytic orchids are *Polystachya,* with 32 species and *Bulbophyllum* with 17 (85 and 27 respectively for East Africa). Obviously, this book doesn't cover the East African orchid flora completely, but the overlap, and therefore the importance of this book for East

Africa, is significant: out of the 80 *Habenaria* species treated, 62 also occur in East Africa. The flora of Malawi, furthermore, has 46 out of 56 *Eulophia* species, 23 out of 32 *Polystachya* species and 12 out of 17 *Bulbophyllum* species, in common with East Africa.

Anselia africana. Reproduced from B. Stein (1892) Orchideenbuch. Verlag von Paul Parey, Berlin

For each species reference to the original description, as well as to the use in other major recent publications, is given. This is followed by a description of the plant using a terminology that is explained well in the chapter on structure. Next are notes on the habitat, flowering time, distribution within and outside of Malawi. For most of the species a line drawing and a dot map of the distribution in Malawi is also given; 119 out of 402 species are even illustrated with a high quality photograph. The picture of *Disa ornithantha* on the dust cover is just one example of the superb photography that illustrates this book. All in all the production and printing is of a very high standard. The species descriptions are followed by a glossary of the botanical terms used and a checklist of Malawian orchids. Wherever possible, this checklist refers to an herbarium specimen for the Northern, Central and Southern region. The book ends with a list of the literature consulted and an index that also includes all the synonyms.

The price (and the size) of Orchids of Malawi do not make it suitable as a field guide, but as a reference work of outstanding quality it is worth every single penny.

Benny Bytebier, Plant Conservation and Propagation Unit, East African Herbarium, NMK, Box 40658, Nairobi

Golden Dunes and Desert Mountains by Anna Merz. Ex Africa, Nanyuki, Kenya. 1992. Includes line drawings by Ann Bennet, several maps, and photographs.

In the author's own words, "this book is a travelogue", but it is also a tale of various individuals, some human, but most of the furred and feathered variety, who won Anna's heart over the years. My only complaint (and a very minor one) which I will register at the beginning and then forget about, is that, as a trained barrister, Anna writes more matter-of-factly than a book of this kind needs. It is a small distraction from an enjoyable account.

She sets the tone for the book in the early chapters by giving us a description of herself as a child and young girl, by which time her nonconformist nature was already asserting itself. Her first trip outside Europe (to Ceylon) did not, as her parents apparently

wished, 'cure' her of her desire to travel, it merely confirmed it. The description of that sea voyage to Ceylon and her various adventures and misadventures while there is followed by that of an even more hectic and adventuresome journey overland delivering a Landrover to Quetta in Pakistan.

However, it is when she travels to Ghana that the real heart of this story begins. A very large part of her life was spent in Ghana and she loved it as many of us did in those days when one could still ride or walk through beautiful intact forest. Much of the West Africa that she describes is not to be seen anymore having been destroyed by those who believed that they were improving the lives of the inhabitants by cutting down and plowing under these beautiful rain forests to create giant large scale farms where small scale farming has always been highly successful and much less damaging. Or by those who are tearing out the timber for hardwood or to make room for gold mining. Her work in Ghana as an honorary game warden gave her access to some interesting areas not normally seen by other Europeans and makes for interesting reading.

She and her second husband, Karl, loved deserts and traveled extensively in the Sahara. Having heard many of these tales first hand upon their return from some of those trips, I can only say that she does not exaggerate in her descriptions of the thrills, and sometimes terrors, of these very ambitious expeditions. They usually, though not always, succeeded in what they set out to do, and always had a wonderful time doing it.

Her description of the Hindu Kush and of their travels in Uganda make it very clear that cold, wet, high mountains are definitely not her favourite things. Don't expect many delightful descriptions of beautiful scenery here, as she did not much enjoy the Hindu Kush trip. Her descriptions of the mud and continual wet and cold of the Ruwenzoris is certainly honest but, for those of us who share her dislike of such conditions, very off-putting. However, even here she manages to be intrigued by the birds, views and an interesting rodent brought her by one of her dogs. It is only once they are off the mountains that she really seems to put her heart into enjoying Uganda and the rest of her descriptions of East Africa reflect her love of and interest in the area which ultimately became her home and that of the project to which she has dedicated the later part of her life, the Ngare Sergoi Rhino Refuge in Kenya.

I happily recommend this book to all who love nature and travel, especially since all of the royalties go to the Ngare Sergoi Charitable Trust in support of the Ngare Sergoi Rhino Refuge.

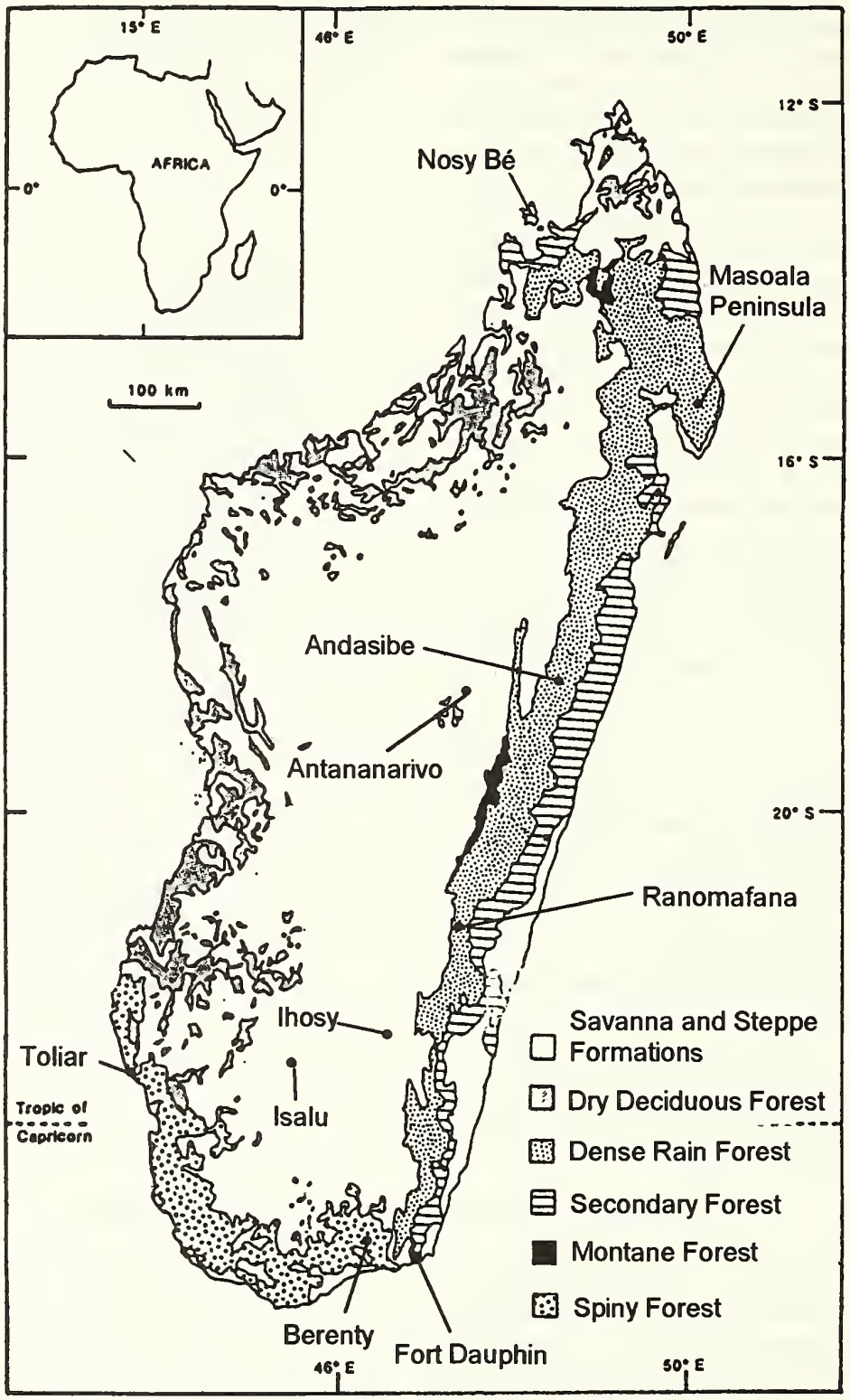
Lorna Depew, Box 57, Kilifi

Field Trip Report

MADAGASCAR—LAND OF ENDEMISM

Every book that I opened before setting off on our family holiday to Madagascar said that it was different, but I had never come across a set of such distinctive species before all common names seem to begin with the word Madagascar, and all scientific species names seemed to end with *madagscariensis*.

During a two week visit in July this year, we travelled from Antananarivo (generally referred to as Tana), the capital city located in the central highlands (1,250 m asl), to Tolanaro (Fort Dauphin) and Toliar both at sea level in the drier south, Ranomafana in the wet eastern mountains,



Places visited or mentioned in the text, on a vegetation map taken from the IUCN Red Data Book on lemurs

and the islands of Nosy Bé, Nosy Komba and Nosy Tanihely. Our travel, lodging and the patient answering of questions was arranged by Mark Pidgeon and Sheila O'Connor, both with over seven years experience of field research and conservation work on the island.

Driving into the forest at Ranaomafana, a recently created National Park (43,000 ha), we were welcomed by some familiar "Kenyan" trees: a silvery undersided *Croton*, a *Dombeya* with red young leaves, an *Albizia* with dense clusters of russet pods, and *Harungana madagascariensis* looking exactly like those growing on the forest edge in Kakamega. Also familiar were the plantations of pines and blushes of peach blossom, both exotic to Madagascar and Kenya, unlike the traveller's palms and tall *Terminalia tricristata* which are also found in both countries, but are endemic to Madagascar.

I have omitted the plant species' names because there is no useful field manual for the identification of plants in Madagascar, and since 65–80% of the flora is endemic one can safely assume that the Kenya look-alikes are not the same species (*Harungana* being one of few exceptions).

For visitors from Kenya, it was surprising to realise that Madagascar and Kenya have almost the same land area. Both also have large dry regions and small forest patches growing at higher altitudes. However, for the natural historian, further comparisons tend only to show dissimilarities.

Madagascar was separated from mainland Africa about 200 million years ago, at the time of the evolution of higher plants and well before the main mammal or bird radiations had graced the planet. The world's fourth largest island then drifted away from Mozambique (300 km to the west) and has had to be colonised across this stretch of water. Humans arrived only relatively recently (1,500–2,000 yr BP), travelling from Asia/Indonesia and bringing with them their "zebu" cattle—both species currently number 12 million, less than half of Kenya's figures.

The plants, which presumably had a head start in the evolutionary race, have radiated impressively to number some 10,000 species compared with only 6–7,000 recorded in Kenya. Two "primitive" orders that show impressive species arrays are the palms with over 130 species, excluding the traveller's palm which is of course related to the bananas, and the treeferns with over 30 species. Neither group is abundant in Kenya.

Two other families immediately conspicuous from the LandRover window were the varieties of bamboos, whether planted as hedges in town or scrambling through the understorey at Ranomafana, and panadanas (76 species), including the spade-leafed bushes in the lagoon at Fort Dauphin and stream-side christmas trees in the dry zone near Isalu National Park. This abundance of species which tend to be common in Asian rather than African forests, which is further supported by the presence of pitcher plants growing on sandy soils at the south coast just as they do in coastal Borneo, gave a very different flavour to the Kenyans.

It was also good to see *Draceana* sp growing in the wild at Ranomafana; my only previous view was in the car park of the Museum in Nairobi.

The main reason for bouncing along the appalling road to the thermal spring resort of Ranomafana, were the Hotel de Thermes is well past its best, was to see some of the forest lemurs. No simian primates have reached Madagascar, but the 30 species of lemurs (prosimian primates) which did cross from Africa make an impressive alternative. Twenty-eight species are endemic to the island, the other two are also found on the Comores Islands, 12 of the 13 genera and four of the five families are endemic. Rather impressive compared with Kenya's single primate species of which are endemic two sub-species. Unfortunately 14 additional lemur species have gone extinct in the recent

past, probably at the hands of man, including some giant land lemurs (*ca.*75 kg).

A new species of Bamboo Lemur (*Hapalemur aureus*) was identified in the Ranomafana as recently as 1987. This attractive gold tailed species shares the forest with two other bamboo lemurs (*H. griseus* and *H. simus*), five other nocturnal species: Small-toothed Sportive Lemur (*Lepilemur microdon*), Avahi (*Avahi laniger*), weird looking Aye-aye (*Daubentonia madagascariensis*), small Greater Dwarf Lemur (*Cherogaleus major*) and tiny Brown Mouse Lemur (*Microcebus rufus*); and four diurnal species: Diademed Sifaka (*Propithecus diadema*), Red-bellied Lemur (*Eulemur=Lemur rubriventer*), Red-fronted Lemur (*E. fulvous rufus*), and Ruffed Lemur (*Varecia variegata*).

It is intriguing to imagine how a dozen lemur species manage to divide up the food resources in this low-stature forest. Differences in body size, ranging patterns and diurnal/nocturnal habits must account for much of the ecological separation. One other interesting point, however, was the wide range of bamboos which is obviously important to support the three bamboo lemurs, and the ability of the Golden Bamboo Lemur to feed on bamboo shoots that are cyanogenic may offer an important competitive advantage.

Unfortunately viewing conditions on the moderately high very steep ridges, dissected by an impressive gorge of the Wamarona river, were poor during our morning's walk. Swirling mists shrouded the hills, punctuated with downpours, so we only saw a red-fronted lemur and a pair of red-bellied lemurs; the male of the later sporting fine white facial skin around the eyes as they sprung and scurried through tree canopies forest. However these conditions were perfect for the punctuation of my ankles by small leeches that got through my socks; presumably another legacy of Asia! September/October are drier months to visit.

The worst time to visit is during the cyclone season, which peaks in February/March, when hurricanes tear through the country. This year three major cyclones wreaked havoc, one bringing the docks to a stand-still, and wrecking the iron bridge to the thermal baths at Ranomafana.

While trying to gaze through the mists for lemurs, we were lucky to see a Collared Nightjar (*Caprimulgus enarratus*), damp upon the sodden leaf litter, while some small greenbuls (*Phyllastrephus* spp) gleaned the glistening foliage and a drongo also dashed about. Once again I felt like I was having another wet morning in the Mau Forest of the western Rift Valley, until a mixed party of vangas and jerys moved past. Both genera are endemic, the jerys (*Hartertula* spp) looking and acting very like white-eyes, while the endemic family of vangas represent an extraordinary radiation of species that seem to have occupied niches filled by several genera on mainland Africa.

Tylas Vanga (*Tylas eduardi*) looked and acted like a Black-headed Oriole searching and volleying. The similar sized, but thicker-billed Pollen's Vanga (*Xenopirostris polleni*) and Rufous Vanga (*Schetba rufa*) were also members of the feeding flock, the latter tending towards a ground thrush in its niche. It is not surprising to see these ecological similarities, simplistic as they may be, since there are only 256 Malagasy breeding bird species, compared to 1,070 in Kenya. Whole families have failed to cross the Mozambique channel: no cranes, no woodpeckers, no hornbills, no barbets, no vultures! In partial compensation, half the Malagasy birds are endemic.

The 'ostriches' did make it, and no doubt lived in the extensive grasslands of the southern plateau, but all were wiped out when humans arrived. The most impressive of the 15 or so species was the gigantic *Aepyornis*, which stood 2.5 m tall on leg bones as thick as those of a rhinoceros. Its legacy to posterity are layers of egg shells up

to half a metre deep in the Faux Cap area at the southern tip of the island. Occasionally whole eggs are found in this area, or elsewhere when floods break riverbanks, and a policy is needed to keep some of these surprising landscapes intact while allowing collection of eggs and eggshells for export in other areas.

Birding was more rewarding in the open spiny forests, found in the south and south-west. They are dominated by succulent trees in the endemic family Didieriaceae, that are characterised by a green fleshy outer layer, surrounding a woody centre, with rows of spines alternating with leaves running the length of the tree. They have a distinct cactus appearance, but *Didieria* trees are not cacti - there is only one endemic cactus which is epiphytic and has mistletoe-like fruits which are bird dispersed.

The journey south was tortuous, taking a full two days (over 12 hours driving per day) on very poor roads to cover the 1,000 km from Tana to Fort Dauphin. Much better to fly if you can arrange transport at the other end and, as noted by Joe Grumley in his recent *Ballya* article, accommodation away from the few main tourist centres is generally poor and/or very expensive.

All along the road we saw Madagscan kestrels (*Falco newtoni*), pied crows and black kites; three ubiquitous species, abundant even in Tana. There were also many Madagascan drongos (*Dicrurus forficatus*), distinguished from mainland drongos by a thin crest at the base of the bill. In the plateau region between Tana and Ambalavao, where the higher rainfall supports terraced rice paddies, cattle egrets and hammerkops were abundant. The latter a bad omen for me; I prefer the telegraph pole perching Long-crested Eagle of East Africa.

On the second day, as we drove through the Horombe Plateau grasslands, with their regular small red termite mounds, we put up hundreds of Namaqua Doves rocketing from the sandy roads. Once we glimpsed a flock of the widespread Grey-headed Lovebird (*Agapornis cana*), a Lesser Vasa Parrot (*Coracopsis nigra*) and the rare Banded Kestrel (*F. zoniventris*) sitting on a sisal inflorescence. Not many species for 24 hours driving.

However, within minutes of walking in spiny forest at Andohahela Reserve (three parcels covering 76,000 ha) just north of Ft Dauphin, we saw a Paradise Flycatcher (*Tersiphone mutata*), Souimanga Sunbird (*Nectarinia souimanaga*) and a Red-capped Coua (*Coua ruficeps*) which looked and ran like an american road runner. The following day another Coua, the Crested (*C. cristata*) and the day after at Berenty the Giant Coua (*C. gigas*) brought to three the species in this endemic family. The latter two behaved more like coucals, to which they have close taxonomic affinity.

Other birds of interest were the Greater Vasa (*C. vasa*), a parrot, and the Sickle-billed Vanga (*Falculea palliata*) which was like a stout Scimitarbill in Kenya's dry country, making a living delving through dead bark and epiphytes in the same way. Numerous other species were recorded, and identified using Oliver Langrand's excellent field guide. Unfortunately this book is not available in Madagascar bookstores, so take your own copy from UK or the US—it is published by Yale University Press.

Despite the easy bird viewing and the strange bird forms, the lemurs stole the day both at Andohahela with the White-coated Verreaux's Sifakas springing from spiny branch to spiny branch, and in the evergreen gallery forest at Berenty by the Ring-tailed lemurs which are more quadrupedal and cruise along the forest paths with their banded tails unfurled standing high behind them. The views of the Brown Lemurs and Berenty and Red-fronted Lemurs at Renomafera were poor, but the views of the dimorphic Black Lemur (*E. macaco*), striking black males and ginger/cream females with pale neck ruffs, were pitiful in the tourist-trap

village to which we were taken during a boat trip from the beach hotels of Nosy Be.

All of these would no doubt have been eclipsed by the mostly black coated Indris, the largest of the lemurs which make extraordinary loud calls in the rain forest at Perinet, exposing the incisor tooth-comb on their lower jaws as they sing. Unfortunately we couldn't make the 2.5 hour drive east of Tana to see these, along with Avahis, because Harry (2) got malaria. This a major concern when visitors descend from the high plateau, a problem not helped by the lack of mosquito nets in any hotels we visited—there is a very laissez faire attitude to the problem, which no doubt will change if and when the tourist industry picks up.

At present most visitors are from France and Italy. French is spoken in most towns, french-style baguette loaves are served with all meals and some quite acceptable wine is produced in Madagascar—red and "gris". All of this becomes increasingly scarce as one drives south; descending from the main plateau, Ihosy (pronounced ee-oosh) being a poor, windswept town with a single clean small motel serving very insipid soup.

The management of natural resource use to provide tourists with souvenirs needs some urgent attention; mounds of sea shells were readily available, crocodile and boa skin bags and shoes were generally on sale; turtle shells ornaments were common in curio shops. All are confiscated off tourists (only) if found in your bags at the airport, and posters warning tourists of the problem were displayed in many hotels, but there seems to be no prohibition on sales!

Conservation policies were put into effect in the 1920s, under French colonial government, and presently there are 37 top category protected areas, covering 1.9% of the country and a further 27,000 km^2 of classified forests. There are no large wilderness parks like Tsavo or the Serengeti, since there are no plains game to view. Overall, the complete removal of the natural vegetation by a relatively small human population is striking—only about 10% of the country still has forest and woodland cover, a problem exacerbated by the recent degazettment of a national park in the Maosala Peninsular. Conservation activities in the country are supported strongly by NGOs, in particular WWF which has a very large programme.

Other pleasures of the island which we enjoyed included a small patch of dry deciduous forest, which dominates western Madagascar, on the road from Toliar. It looked like the dry *Cynometra* forest in Arabuko-Sokoke forest on the north Kenya coast. This forest patch was near an area of fire-resistant Borasus-like palms (*Mademia noblis*) on the dry and wind swept Horombe Plateau near Isalo National Park famed for its striking erosion patterns on ancient sandstone deposits. Deep erosion gullies are a major feature of the Madagascan landscape.

Treasures we missed were: the forests of the Masoala Peninsula which have the highest plant diversity on the island; the limestone pinnacles; the chameleons for which Madagascar is famous—the island holds two-thirds of the worlds species (60 species), ranging from over 2 kg to a tiny species smaller than a human thumb-nail. We also missed the giant forest cockroach, at 90 g heavier than a Mouse Lemur, but we did hear the hissing cockroaches in the forest at Berenty. On a short visit it is inevitable that we could miss more than we saw, but the Zoo/Botanical Garden (Parc de Tsimbazaza) in Antananarivo has some of these plants and animal species on display, the animals often in rather small cages, and it is a very pleasant and safe place to take a stroll. It also houses interesting natural history and ethnography museums.

Ours was a fascinating field trip, worth the effort but give yourselves plenty of time.

Glyn Davies, KIFCON, National Museums of Kenya, P.O. Box 40658, Nairobi

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Articles and Notes

UGANDA'S IMPENETRABLE FOREST— A BIRDING HOT SPOT

The Bwindi-Impenetrable Forest National Park (331 km²) is located about 25 km north of the Virunga Volcanoes in south-western Uganda (figs 1 & 2). It is one of the largest forests in East Africa containing both montane and lowland forest in a continuum. As a result of its size and altitudinal range (1,160–2,650 m), and its probable role as a Pleistocene refuge, the species diversity of the "Impenetrable Forest" is extremely high. It is believed to be the richest forest in East Africa for trees, ferns, birds and butterflies, and probably many other taxa, including mammals. Among these are many species which occur only in this region of Africa and/or are in danger of extinction. This forest is, therefore, of vital importance for their continued survival. Foremost among these is the mountain gorilla, of which about 300 live in the Impenetrable Forest (Butynski, 1984; Butynski & Kalina, 1993).

The Impenetrable Forest is a mere remnant of a very large forest which once covered much of western Uganda, Rwanda, Burundi and eastern Zaire. Today, this forest is an ecological island surrounded by one of the highest human population densities in Africa (100–450 people/km²). As such, beyond its borders there is virtually no natural forest remaining and the land is intensively cultivated. As a result of the importance of the Impenetrable Forest, and the surrounding land-use problems, several conservation initiatives have been established in the region in recent years (Butynski & Kalina, 1993). These include the Impenetrable Forest Conservation Project, Development Through Conservation Project, Institute of Tropical Forest Conservation and International Gorilla Conservation Program - Uganda.

African Green Broadbill

The Birds

The bird list for the Impenetrable Forest currently totals 346 species: 21 migrant species; 46 non-forest species; 95 forest/non-forest species; 184 forest species (Kalina & Butynski, 1992). We estimate that, with further research, the number of forest bird species will total close to 200. The Impenetrable Forest is of particular importance for the conservation of montane forest birds. At least 71 of the 79 montane forest bird species in the Albertine Rift Afromontane Region occur in the Impenetrable Forest (Keith, 1980; Kalina & Butynski, 1992), including 23 of the 28 endemics (Keith, 1980; Prigogine, 1985;

Collar & Stuart, 1988; Dowsett-Lemaire & Dowsett, 1990). The 23 regional endemic species are:

- Handsome Francolin (*Francolinus nobilis*)
- Rwenzori Turaco (*Tauraco johnstoni*)
- Rwenzori Nightjar (*Caprimulgus ruwenzori*)
- Dwarf Honeyguide (*Indicator pumilio*)
- African Green Broadbill (*Pseudocalyptomena graueri*)
- Stripe-breasted Tit (*Parus fasciiventer*)
- Red-throated Alethe (*Alethe poliophrys*)
- Archer's Ground Robin (*Dryocichloides archeri*)
- Kivu Ground Thrush (*Turdus tanganjicae*)
- Mountain Masked Apalis (*Apalis personata*)
- Collared (Rwenzori) Apalis (*Apalis ruwenzori*)
- Grauer's Rush Warbler (*Bradypterus graueri*)
- Grauer's Warbler (*Graueria vittata*)
- Short-tailed Warbler (*Hemitesia neumanni*)
- Red-faced Woodland Warbler (*Phyllosocopus laetus*)
- Yellow-eyed Black Flycatcher (*Melaenornis ardesiaca*)
- Rwenzori Batis (*Batis diops*)
- Blue-headed Sunbird (*Nectarinia alinae*)
- Purple-breasted Sunbird (*Nectarinia purpureiventris*)
- Regal Sunbird (*Nectarinia regia*)
- Strange Weaver (*Ploceus alienus*)
- Dusky Crimson-wing (*Cryptospiza jacksoni*)
- Shelley's Crimson-wing (*Cryptospiza shelleyi*)

Seven Impenetrable Forest bird species are listed in the Red Data Book (Collar & Stuart, 1985). These are:

- Dwarf Honeyguide (near threatened)
- African Green Broadbill (rare)
- Kivu Ground Thrush (near threatened)
- Forest Ground Thrush (rare)
- Grauer's Rush Warbler (vulnerable)
- Chapin's Flycatcher (rare)
- Shelley's Crimson-wing (near threatened)

Eight species of birds found in the Impenetrable Forest are not known to occur anywhere else in East Africa. There are:

- Fraser's Eagle Owl (*Bubo poensis*)
- Dwarf Honeyguide (*Indicator pumilio*)
- African Green Broadbill (*Pseudocalyptomena graueri*)
- White-bellied Robin Chat (*Cossypha roberti*)
- Grauer's Warbler (*Graueria vittata*)
- Short-tailed Warbler (*Hemitesia neumanni*)
- Yellow-eyed Black Flycatcher (*Melaenornis ardesiaca*)
- Dusky Twinspot (*Clytospiza cinereovinacea*)

Another 19 bird species are known to occur in East Africa only in the Impenetrable Forest and one or two other forests.

Bird-watching

Few bird-watchers visiting the Impenetrable Forest will be disappointed with the birds, the scenery or the biodiversity. Experienced bird-watchers see and/or hear more than 100 species per day, including 10 to 15 of the regional endemics. A visit to this forest will add many new species to most life lists. Serious bird-watchers will want to visit for no fewer than five days. If you have the time, we recommend the following itinerary:

Days 1 & 2. Stay two full days at Ruhizha (2,300 m) either camping or staying in the rest house managed by the Institute of Tropical Forest Conservation. Bird-watch for one day along the main dirt road moving south-east (towards Kabale Town) for about 6 km and into the bamboo zone (2,525 m). The walking is easy and the birds are plentiful.

The next day take the trail just south-east of the rest house through the forest, downhill, to Mubwindi Swamp (2,150 m). This is about a 4 km walk each way. You will see several interesting bird species along this walk which are not found along the road.

Day 3. Travel slowly by vehicle from Ruhizha along the main dirt road to Kitahurira/Ihihizo River (1,550 m) where you, once again, enter the forest. Stop the vehicle occasionally to bird-watch and enjoy the scenery as you move from Ruhizha to Kitahurira. Spend several hours at Kitahurira to search for birds along the road. The road

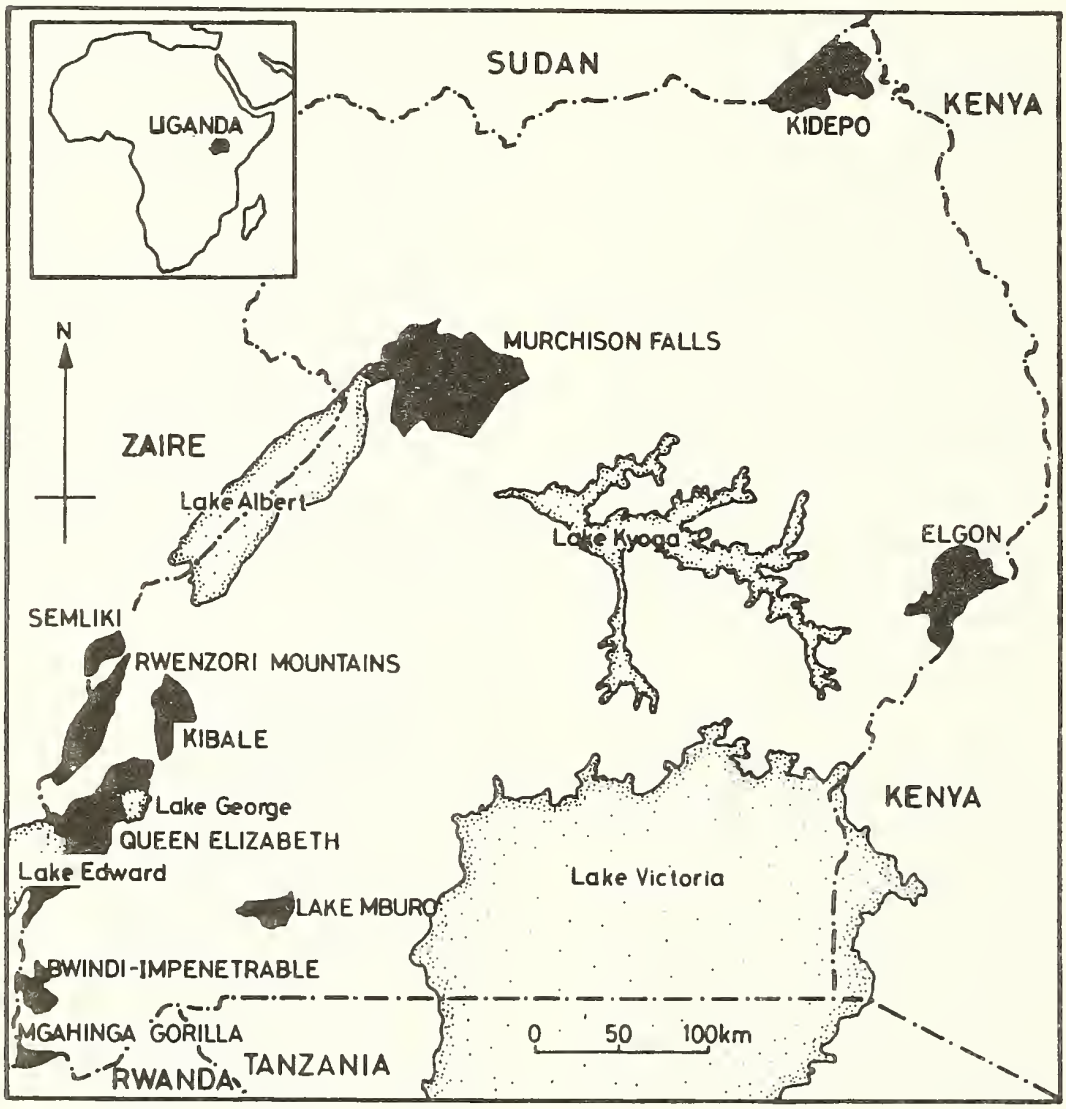

Figure 1. Location of the Bwindi-Impenetrable Forest National Park and Uganda's nine other national parks. The five largest lakes in Uganda are also shown.

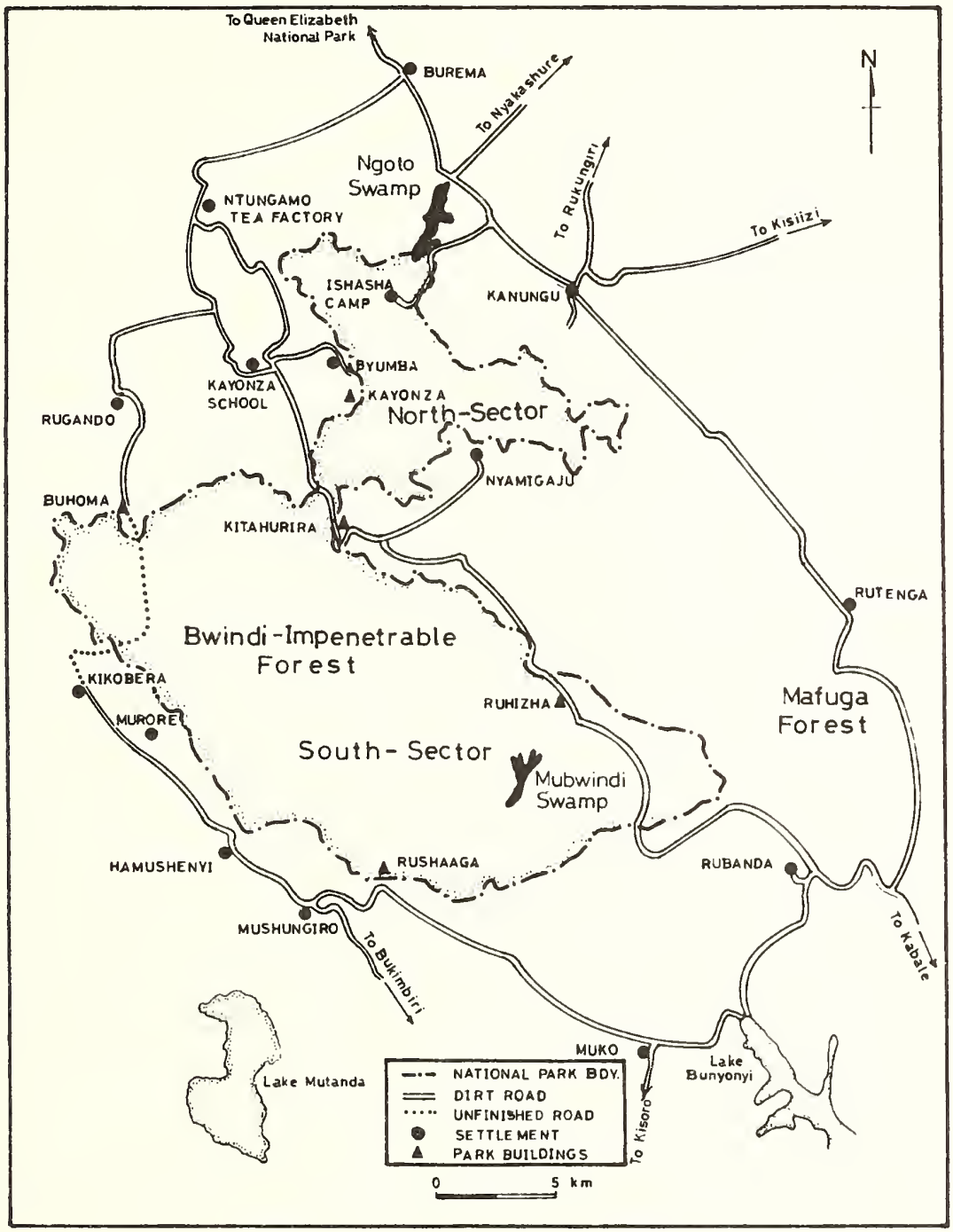

Figure 2. The Impenetrable Forest is conveniently divided into a "North Sector" and a "South Sector" demarcated by the road which runs through the narrow neck of forest at Kitahurira. The system of roads around and through the Impenetrable Forest is shown, as are the locations of the larger villages.

runs through the forest here for about 2 km. A few hours before dusk begin the 1 h drive to Buhoma (1,550 m), the site of the gorilla tourism program. Here you can camp, stay at the bandas or in luxury tented camp.

Day 4 & 5. Spend one day bird-watching around camp and along the 7 km road that runs southwards through the forest. The road is relatively level and the bird-watching is excellent in this mid-altitude forest. The bird community here differs dramatically from that at Ruhizha/Mbwindi Swamp. If you have a day to spare, this is a good place to spend it. The next day, find a guide who can take you to one of several trails that run through the North (Kayonza) Sector of the forest and down to the Ishasha River. The northern-most part of the Impenetrable Forest (where the Ishasha River leaves the forest) is the lowest part (1,400 m). You will find several birds here which occur nowhere else in the Impenetrable Forest. Return to Buhoma for the night.

Bird-watching in the Impenetrable Forest is productive and enjoyable at anytime of the year. We prefer the wetter months (February–May and September–November) as many bird species are breeding, and thus singing and active. Also, the air is relatively clear of smoke and dust during the wetter periods so fine views of the Virunga Volcanoes, Rwenzori Mountains, Lake Edward, and the Impenetrable Forest itself, can be obtained.

A bird check-list for the Impenetrable Forest will soon be published by, and available from, the East African Natural History Society (Kalina & Butynski, in press).

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THE DIPTERA FAUNA OF EAST AFRICA: A PRELIMINARY OVERVIEW

Recently the Department of Invertebrate Zoology in collaboration with the Centre for Biodiversity, both at the National Museums of Kenya (NMK), compiled a check list of all Diptera (two-winged insects, including flies, midges and mosquitoes) from East Africa comprising Kenya, Tanzania and Uganda. The list is based on the Catalogue of the Diptera of the Afrotropical Region (Crosskey, 1980) and supplemented with identified material in the collections of NMK.

For some groups—like Syrphidae and Tephritidae—the literature has been scanned for records more recent than 1980, and for any nomenclatural changes. The long term goal is to do this for all families within the order of Diptera. The ultimate purpose of this list is to include it as a taxonomic reference tool for the development of a relational database that will eventually include all specimen records of the collections of NMK.

Entry of these individual records is already done for some families like Asilidae, Bombyliidae, Syrphidae (see Vanden Berghe *et al.*, 1994), Tabanidae and Tephritidae. Based on the data gathered for this check list we could deduct some simple statistics on general patterns in biodiversity and some of the apparent deviations from the general patterns in specific families.

Some generalisations had to be made in compiling this list. For example, species mentioned for 'East Africa', 'eastern Africa' or 'generally distributed' are assumed to occur in all three countries. No distinction here is made for subspecies or varieties in the species counts for this article. The distributions of all infra-specific taxa are taken together with their respective species, though they are entered as separate entities in the taxonomic check-list.

Occurrence in individual countries

Table 1 shows the occurrence of Diptera species for the three individual countries ('Kp', 'Tp', 'Up'). All three countries have a similar number of species found in their area (2,653, 2,338 and 2,514 respectively), despite their differences in surface area. A similar tendency was noted for mammals in East Africa (Gathua & Vanden Berghe, 1993). This general trend is reflected in the counts for individual families, though a few exceptions can be noted. In most cases these are probably caused by research and/or collecting bias. However, some of the differences seem to reflect actual habitat preferences. Asilidae and Bombyliidae for example are known to prefer semi-arid and arid areas, a habitat type that is more prevalent in Kenya and Tanzania than in Uganda. On the other hand, Afrotropical Micropezidae are mainly reported from equatorial forested regions, which are better represented in Uganda. For other families, like Acroceridae, Cecidomyiidae, Drosophilidae, Empididae, Lauxaniidae and Pyrgotidae, no apparent reason can be given.

Overall count of Diptera species in East Africa

In total, 4880 species are reported from the region. Figure 1 summarises the distribution of dipteran species through the region. The following tendencies can be observed. Firstly, approximately one out of five Diptera species occurs in all three countries (895 out of 4880 or 18.3%). Secondly, one out of five insects occurs in only one of the three countries (23.3, 22.6 and 16.7% for Uganda, Kenya and Tanzania respectively). This kind

Table 1: Number of dipteran species per family. Leftmost three columns ('Kp', 'Tp', 'Up'): number of species occurring in Kenya, Tanzania and Uganda. Columns 4 to 10: number of species occurring exclusively in given combination. Rightmost column: total number of species occurring in the region.

Family	Kp	Tp	Up	K	T	U	KT	KU	TU	KTU	Total
Acroceridae	7	3	0	6	2	0	1	0	0	0	9
Agromyzidae	26	26	16	17	16	8	4	2	3	3	53
Anisopodidae	2	4	1	0	2	0	1	0	0	1	4
Anthomyiidae	31	18	27	10	2	7	2	6	1	13	41
Anthomyzidae	0	1	0	0	1	0	0	0	0	0	1
Asilidae	84	105	48	43	66	23	20	6	4	15	177
Asteiidae	2	1	3	2	0	2	0	0	1	0	5
Athericidae	0	0	2	0	0	2	0	0	0	0	2
Aulacigastridae	2	0	0	2	0	0	0	0	0	0	2
Bibionidae	21	19	27	3	1	9	0	0	0	18	31
Bombyliidae	136	98	65	65	34	15	26	12	5	33	190
Braulidae	0	1	0	0	1	0	0	0	0	0	1
Calliphoridae	89	92	90	15	22	14	4	10	6	60	131
Camillidae	1	0	0	1	0	0	0	0	0	0	1
Cecidomyiidae	30	26	6	27	22	4	2	0	1	1	57
Celyphidae	1	2	2	0	1	1	0	0	0	1	3
Ceratopogonidae	56	44	58	23	14	30	7	5	2	21	102
Chamaemyiidae	1	0	0	1	0	0	0	0	0	0	1
Chaoboridae	4	2	6	0	0	2	0	2	0	2	6
Chironomidae	66	42	77	34	11	42	1	5	4	26	123
Chloropidae	71	85	106	21	34	57	13	11	12	26	174
Conopidae	15	19	21	6	12	15	4	3	1	2	43
Cryptochetidae	1	2	3	1	2	3	0	0	0	0	6
Culicidae	224	212	248	35	34	73	32	29	18	128	349
Curtonotidae	3	2	1	1	0	0	1	0	0	1	3
Diopsidae	28	33	24	7	12	5	2	0	0	19	45
Dixidae	1	1	2	0	1	1	0	1	0	0	3
Dolichopodidae	35	44	15	30	39	13	4	1	1	0	88
Drosophilidae	40	20	61	21	3	38	1	7	5	11	86
Empididae	26	15	38	21	14	32	0	5	1	0	73
Ephydridae	35	27	24	15	14	6	3	8	1	9	56
Fanniidae	6	6	6	0	1	0	0	1	0	5	7
Gasterophilidae	8	9	8	0	1	1	1	0	0	7	10
Glossinidae	6	11	11	0	2	6	4	0	3	2	17
Heleomyzidae	7	5	7	3	2	5	2	1	0	1	14
Hippoboscidae	24	19	25	3	1	5	2	4	1	15	31

Table 1 (continued)

Family	Kp	Tp	Up	K	T	U	KT	KU	TU	KTU	Total
Lauxaniidae	7	21	2	4	18	0	1	0	0	2	25
Lonchaeidae	11	5	6	6	2	3	2	2	0	1	16
Lonchopteridae	1	0	0	1	0	0	0	0	0	0	1
Micropezidae	1	6	20	0	2	16	0	0	3	1	22
Milichiidae	8	10	7	2	2	1	2	0	2	4	13
Mormotomyiidae	1	0	0	1	0	0	0	0	0	0	1
Muscidae	320	249	360	110	54	151	28	42	27	140	552
Mycetophilidae	23	34	21	11	24	11	2	2	0	8	58
Nemestrinidae	4	1	0	3	0	0	1	0	0	0	4
Neriidae	0	4	1	0	3	0	0	0	1	0	4
Nycteribiidae	14	12	11	4	2	3	3	1	1	6	20
Odiniidae	0	0	2	0	0	2	0	0	0	0	2
Oestridae	10	9	8	2	2	2	2	1	0	5	14
Opomyzidae	1	1	0	1	1	0	0	0	0	0	2
Otitidae	4	4	3	2	2	1	0	0	0	2	7
Phoridae	19	29	23	19	26	20	0	0	3	0	68
Piophilidae	0	2	1	0	2	1	0	0	0	0	3
Pipunculidae	28	23	19	8	3	2	3	0	0	17	33
Platypezidae	3	4	0	2	3	0	1	0	0	0	6
Platystomatidae	16	43	32	3	26	18	3	0	4	10	64
Psilidae	0	3	0	0	3	0	0	0	0	0	3
Psychodidae	48	20	50	27	2	31	3	4	1	14	82
Ptychopteridae	0	1	2	0	1	2	0	0	0	0	3
Pyrgotidae	12	15	4	10	13	4	2	0	0	0	29
Rhagionidae	1	0	3	0	0	2	0	1	0	0	3
Rhinophoridae	2	0	2	2	0	2	0	0	0	0	4
Sarcophagidae	50	50	33	20	20	13	13	3	3	14	86
Scathophagidae	4	2	1	2	0	0	1	0	0	1	4
Scatopsidae	4	6	2	1	4	0	1	1	0	1	8
Scenopinidae	5	1	1	4	0	1	1	0	0	0	6
Sciaridae	6	4	0	5	3	0	1	0	0	0	9
Sciomyzidae	14	12	8	8	4	3	3	0	2	3	23
Sepsidae	14	20	10	6	12	2	0	0	0	8	28
Simuliidae	36	26	37	8	8	10	2	11	1	15	55
Sphaeroceridae	48	26	16	36	14	6	2	0	0	10	68
Stratiomyidae	29	45	43	4	19	16	1	2	3	22	67
Streblidae	10	10	5	3	2	1	4	0	1	3	14
Syrphidae	151	105	72	63	26	15	37	15	6	36	198
Tabanidae	103	124	94	22	58	39	30	19	4	32	204

Table 1 (continued)

Family	Kp	Tp	Up	K	T	U	KT	KU	TU	KTU	Total
Tachinidae	186	197	222	64	74	92	20	27	28	75	380
Tachiniscidae	0	0	1	0	0	1	0	0	0	0	1
Tephritidae	249	113	148	161	50	81	30	34	9	24	389
Therevidae	9	8	5	4	3	2	2	0	0	3	14
Tipulidae	112	97	211	61	55	162	13	20	11	18	340
Xylomyidae	0	2	0	0	2	0	0	0	0	0	2
Grand Total	**2653**	**2338**	**2514**	**1103**	**912**	**1135**	**351**	**304**	**180**	**895**	**4880**

of endemism or common occurrence within the region of East Africa can only be analysed properly in a global Afrotropical perspective. Such an analysis is however beyond the scope of the present study. The remaining one out of five Diptera is found in any combination between two countries. In this respect, the smallest overlap is found between Uganda and Tanzania, while Kenya shows a greater overlap with both other countries. This is possibly the result of the geographical position of the countries studied, Kenya being in an intermediate position and sharing a much more extensive border line with the other countries.

Count of Diptera species per family

Table 1 shows the same kind of breakdown of occurrence for the individual families (columns 4 to 10). In general, the same tendencies as outlined above are also found in most families. The exceptions can be grouped in three categories.

Overall occurrences (column labelled 'KTU')

Certain families show a higher proportion of species generally distributed over the region, like Calliphoridae and Hippoboscidae. The former are coprophagous and necrophagous as well as parasites of mammals; the latter are solely parasites of birds and mammals, which might explain their general distribution. The same applies to Gasterophilidae, although the overall number of species does not allow to draw firm conclusions. Other families show a lack of general distribution. This is extremely outspoken in Dolichopodidae, Empididae, and Phoridae where no species are found in all three areas and the overlap between any two countries is also very limited. The same but in a somewhat less outspoken form is found in Lonchaeidae, Tephritidae and Tipulidae. The cause of this phenomenon is not clear.

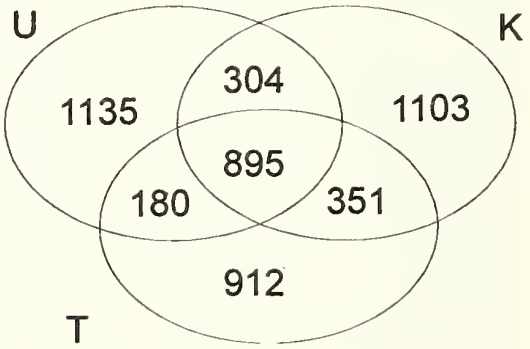

Figure 1: Number of species unique for any country, and for any given combination of countries

'Unique species' (species occurring in a single country; columns labelled 'K', 'T', and 'U')

For some families the number of species recorded for a specific country is proportionally much higher or lower compared to other countries. This is the case in Asilidae, Bombyliidae, Cecidomyiidae and Sphaeroceridae which all show low numbers for Uganda while Micropezidae and Tipulidae show high number for the same country. Other exceptions are the high count of unique species for Lauxaniidae in Tanzania; the low count for Platystomatidae in Kenya, and for Psychodidae in Tanzania. A possible explanation is highlighted above with respect to habitat preferences for Asilidae, Bombyliidae and Micropezidae. For other groups again the reasons for these tendencies are not evident, nor is the fact whether these figures reflect true distribution or merely collecting artefacts.

Dual occurrences (columns labelled 'KT', 'KU' or 'TU')

The following families show low dual occurrences: Syrphidae, Tabanidae, and Tephritidae between Tanzania and Uganda. Most likely these are extreme reflections of the geographical position. On the other hand exceptional high dual occurrences are found in Sarcophagidae (between Kenya and Tanzania) and Simuliidae (between Kenya and Uganda) for which no apparent reason can be found directly.

Conclusion

In general, these preliminary findings must be treated with some reservations. For a relatively little studied group as Diptera, the knowledge of a specific group for a particular area depends much on individual collecting efforts and taxonomic work done of the group concerned. We can safely assume that the picture is largely incomplete for several of the dipteran families listed here. The authors hope that these preliminary findings are an incentive and starting point for more in depth studies.

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A NEW RECORD FOR A RARE KENYAN *EUPHORBIA*

Perusal of family fascicles of the *Flora of Tropical East Africa* reveals that many East African plants are known from only one locality. This applies especially to species occurring in remote arid regions, including many succulent plants in the *Euphorbiaceae* (Carter, 1988). In this note we report a new locality record for a spiny, succulent, species of *Euphorbia* hitherto known only from the type locality.

Euphorbia baioensis S. Carter is a Kenyan endemic. It was described from material collected near the highest peak of Baio, an isolated mountain on the southern edge of the Kaisut Desert (1°46'N, 37°33'E). Although regarded as a rare plant in the wild

Map showing approximate location of the two hills mentioned in the text

because it was known only from the type locality, the plant is easily propagated by rooting cuttings and living plants derived from the original collected specimens are now widespread in cultivation. About 20 km east-south-east of Baio is Holilugum Nder (1°42' N, 37°43'E), whose rocky summit is about 350 m lower than the summit of Baio. This mountain does not appear in the list of known plant collecting localities (Polhill, 1988) and its flora was unknown. During our recent expedition to explore Holilugum Nder we found *E. baioensis* around the edge of the rocky summit (*Newton & Powys 4512*, EA, K). Numerous plants were seen, mostly growing in small soil pockets on the rock face. The succulent, spiny, columnar stems branch freely at and near the base to form large clumps. No flowers were seen, but the distinctive vegetative features are unmistakable. As is the case on Baio, many plants were very dry and no seedlings or young plants were seen. In this harsh environment, where passing cloud enveloping the summit is probably the main source of water, it is likely that regeneration by seed is erratic, but the plants are there and so the species survives.

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NOTES ON THE VEGETATION OF MUFINDI GOLF COURSE

Mufindi golf course was laid out in 1942 by Bert Dale of the then Tanganyika Tea Company, now Brooke Bond Tanzania Ltd, in Lugoda (Hester, 1990). Some aspects of the natural history of the golf course have been covered by Congdon (1990), but for those golfers with a botanical bent, here is a list of indigenous woody species recorded. The golf course is at an elevation of 1,960 to 1,980 m, with a mean annual rainfall of around 1,200 mm at 8°35'S, 35°16'E. Naturally the vegetation would have been the western edge of the montane forests of the southern Udzungwa Mountain escarpment, with continuous forest giving way to tree clumps in grassland. Currently there are only remnants of the natural vegetation amongst extensive tea and Eucalyptus plantations.

Trees include:

Acokanthera laevigata Kupicha, *Aphloia theiformis* (Vahl) Benn., *Apodytes dimidiata* Arn. var *dimidiata, Bersama abyssinica* Fresen. ssp *abyssinica* var *abyssinica, Cassipourrea gummiflua* Tul. var *verticillata* (N.E. Br.) J. Lewis, *Catha edulis* (Vahl) Forssk. ex Endl., *Cussonia spicata* Thunb. *Ekebergia capensis* Sparrm., *Erythrina abyssinica* Lam. ex DC. ssp *abyssinica, Euclea divinorum* Hiern, *Garcinia kingaensis* Engl., *Myrica salicifolia* Hochst. ex A. Rich., *Myrsine melanophloeos* (L.) R. Br. (formerly

Rapanea melanophloeos (L.) Mez), *Mystroxylon aethiopicum* (Thunb.) Loes., *Nuxia congesta* Fresen., *Osyris lanceolata* Hochst. & Steud. ex A. DC., *Peddiea fischeri* Engl., *Psychotria mahonii* C.H. Wright var *puberula* (E.M.A. Petit) Verdc., *Rothmannia fischeri* (K. Schum.) Bullock, *Scolopia stolzii* Gilg var *riparia* (Mildbr. & Sleumer) Sleumer, *Tecoma nyassae* Oliv. (formerly: *Tecomaria capensis* (Thunb.) Spach ssp *nyassae* (Oliver) Brummitt), *Trichocladus ellipticus* Eckl. & Zeyh. ssp *malosanus* (Baker) Verdc.

Shrubs and scandent shrubs include:
Clerodendron myricoies (Hochst.) R. Br. ex Vatke, *Dodonaea viscosa* Jacq. *Euphorbia usambarica* Pax ssp *usambarica, Keetia gueinzii* (Sond.) Bridson, *Maytenus mossambicensis* (Klotzsch) Blakelock var *stolzii* N. Robson, *Oxyanthus speciosus* DC. ssp *stenocarpus* (K. Schum.) Bridson, *Pauridiantha bridelioides* Verdc., *Psychotria zombamontana* (Kuntze) E.M.A. Petit, *Psydrax whitei* Bridson, *Rhamnus prinoides* L'Hér., *Rhus brenanii* Kokwaro, *Rhus longipes* Engl. var *longipes, Rhus natalensis* Bernh., *Rutidea fuscescens* Hiern ssp *fuscesens, Tricalysia acocantheroides* K. Schum., *Tricalysia pallens* Hiern.

Acknowledgements
I am grateful to the Tanzania Commission for Science and Technology for permission to conduct research in Tanzania and to the National Geographic Society, World Wildlife Fund, Caltex Corporation and Missouri Botanical Garden for funding during the period I lived in Mufindi. Roy Gereau commented on nomenclature.

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Jon C. Lovett. Botanical Museum, Gothersgade 130, DK-1123 Copenhagen, Denmark.

BLACKHEADED ORIOLE (*ORIOLUS LARVATUS*) NESTING IN A LANGATA GARDEN

Around 20 May, 1994, Blackheaded Orioles were seen feeding young in a small nest in a fairly open Bombax tree (*Choristsia speciosa*) next to my house. The nest was easy to observe and all details could be well seen.

There were two young in the nest, a small, open cup on a thin branch in a cluster of branchlets and leaves. Both parents were feeding them. As one bird was brilliant yellow on the chest and the other had a slight greenish smudge I could distinguish the two adults from each other. According to J.G. Williams the sexes are identical. I arbitrarily called the brighter one the male.

I noted feeding times and other details about feeding behaviour and made notes on their various calls. Unfortunately neither a photographer nor a tape recorder was available to make a complete record.

I could distinguish three different calls by the parents.

- A very clear, "sonorous" three-note call
- A harsh "piuu"
- A harsh "whoa"

The male called more frequently with the sonorous call which he sometimes alternated with a harsh "pi". The female was more often heard to call with the harsh "piuu". Both the

harsh "piuu" and the sonorous call sometimes elicited "bottom-up" from a nestling. The harsh "piuu" was given before and during feeding the chicks. The sonorous call was uttered when approaching with food and before feeding. The harsh "whoa" sometimes followed a "piuu". The chicks often replied to all calls with chirping. They also fluttered their wings before being fed.

Sometimes an adult insect was brought but many times caterpillars. In the case of large caterpillars the male was seen squeezing the caterpillar into the open bill of the chicks. At one time, after squeezing it, the bird dropped the squeezed outskin to the ground, apparently by accident as it swooped down, picked it up and returned to feed the chick again. Another time the female came with a caterpillar and let the chick suck out the contents.

The first detailed observations were made on 22nd May between about 11.00 and 1.15 during which period the chicks were fed five times at intervals ranging from 20 min to 53 min.

On June 5th I observed the birds from 9.30 to 7.00 pm with a break from 3.30 to 4.40. They were fed at intervals ranging from 4 min to 121 min. The last feeding was at 6.30 pm. On that day the first chick emerged from the nest at 9.30 and sat close to it. It was preening at 10.40 still sitting close to the nest. Between 12.30 and 1.30 it flew to a large bush about 8 meters distant from the Bombax tree. It remained there until 6.30. While only one fledgling was out it was almost always the nestling that was fed first. Occasionally each parent fed one chick, instead of one parent feeding both. During that day I twice saw the male parent pick up the nestling's dropping. At 4.50 and again at 5.22 the male came and called with the sonorous call; in response the nestling stuck its hindquarters up out of the nest and ejected a white blob which was picked up by the parent. I did not see whether it was swallowed or dropped somewhere outside the nest.

On 6th June I observed the birds from 6.30 when the parents' call was first heard until 9.30 when both chicks had fledged and were no longer visible.

Between 6.30 and 9.30 the chicks were fed 16 times at an average interval of eleven minutes. At 6.40 the nestling responded to a harsh "piuu" call by bottom-up but I did not see whether a blob was ejected; if so the parent ignored it. The nestling emerged from the nest at 7.10 sitting briefly on the edge of the nest, then sat next to it on the branch. At 9.15 it flew to a tree about 15 meters distant, where it was not easy to see it.

After the day the second chick had fledged I did not see or hear the birds again.

Judith Rudnai. P.O. Box 42220, Nairobi

Request for Information

East African Mammals List

The EANHS published the 'Checklist of East African Mammals' referred to in the Bulletin 23(4) p 76. The compilation was started by Dr Jonathan Baranga, then at the Makerere University. Dr Glyn Davies and Mwangi Gathua independently compiled a list of Kenyan mammals. The two check-lists were brought together and Tanzanian information added by Prof Kim Howell. This check-list is currently available from the EANHS office.

The check-list is only the first phase of a project to produce an atlas of the mammals of East Africa. This will require a large input of data in order to get meaningful information on the distribution of the mammals. We would like to take this opportunity to once again invite members to send in comments and additional observations to the Mammals

Working Group (Mr Robert Kityo, Museum of Zoology, Makerere University, P.O. Box 10066, Kampala, Mr Andrew Mbiru, Centre for Biodiversity, National Museums of Kenya, P.O. Box 40658, Nairobi, or Prof Kim Howell, Zoology Department, University of Dar es Salaam), or to the Editor. New updates of the checklist will be produced regularly, incorporating this information.

Field Trip Report

WAJEE CAMP BIRD SANCTUARY, 24–25 SEPTEMBER

On the weekend of the 24–25th September a group of nine members went to the Wajee Camp Bird Sanctuary near Nyeri. The camp comprises 10 hectares of natural forest, located between Mt Kenya and the Aberdares 160 km north of Nairobi which was set aside for conservation by the late Reverend Wajee. There is a nature trail winding through the site offering exciting prospects at each turn. Starting from the bird table near the tents the path goes through dense undergrowth, through tunnels and thickets, and on the way we were able to stop and see the porcupine hideout (though no porcupines I'm afraid), and finally the elusive Hinde's Babbler which was a "lifer" for many of us.

The bamboo thickets next to the tents "ALWAYS" have the African Wood Owl we were assured, but on this occasion only those who were out of their tents by 6.30 am managed to see it. The rest of us just heard it calling from the warmth of our sleeping bags!

On our walks Njagi identified the trees and showed us where he had planted new ones and Kuria mimicked all the bird calls to make them come closer. He was successful for most species, but not so with the raptors. However we obtained excellent views of the harrier hawk, Ayre's Hawk Eagle, Verreaux's Eagle and the L:ng-Crested Eagle. One of the highlights was to see Narina's Trogon at close quarters.

Overall we saw over 50 species and enjoyed the peace and tranquility of a lovely site. Our thanks to Major M. Kaigwa for organising the weekend.

Others wishing to go can either camp or hire bandas. Water is available. To book, telephone Nyeri (0171) 60359 or Nairobi 561243 or 226770 or 213840.

Chris Hill, P.O. Box 42814, Nairobi

Society News

FONA: ACHIEVEMENTS AND PLANS

A first article on the Nairobi Arboretum appeared in the December 1992 Bulletin. The question was raised whether it would be possible to set up an *ad hoc* committee "Friends of the Nairobi Arboretum". FONA is now approaching its second anniversary, February 1995. We are grateful to well over 100 Friends who have given donations to revitalise the historic Nairobi arboretum.

A landmark of 1994 was the consultancy by Rod Leslie of Forest Enterprise UK on management (financed by KIFCON). FONA and Forest Department are constantly referring to this blueprint for improvements. In principle the Permanent Secretary of MENR has agreed to the setting up of a Board

of Management but details of operation have still to be worked out.

A slide show for the public on Arboretum management in UK began our FONA programme of events, held on the first Saturday of each month. The December 3rd event focused on donations of an information banda by KIFCON/ODA and the donation of a gatehouse by Economic Housing Group. There was a practical demonstration by the Kenya Horticultural Society of restoring very old creeper covered archways. In earlier FONA events, areas of the arboretum were given names; another was a picnic around the donation of a picnic table and a splendid seat. The September event, Dustbin Day, had a garbage collection and recycling theme. The forester was very grateful that Korogosho Tak group actually made water flow again in the river by the lower gate!

Tree News, our newsletter (which we aim to make a quarterly), is now reaching over 200 people and organisations. It notes some seasonal natural history observations and reports on FONA events. We are planning a replacement for our first brochure, including new photos and a list of achievements, instead of a tale of woe! FONA has made contacts with the tourist industry; Serena Hotels have promised a colour brochure soon to draw in organised groups for a guided walk. Njeri Kimani, at first a keen volunteer has now some payment for a few months as our trainee environmental education officer, working alongside William Wambugu, the arboretum forester. She would guide groups on a city tour. She has already helped our volunteer committee with the October event which focused on teachers and schoolchildren enjoying the trees.

The 1969 map of trees is still being checked on the ground and we require a grid system to pinpoint trees. A card index is being set up for each species. This is in line with advice from Botanic Gardens Conservation International which we joined this year. An article about Nairobi Arboretum appeared in their May magazine and the Chairman was able to meet and discuss the situation with the Africa representative in London recently. We look forward to her visiting Kenya in December.

Forest Department now provide Forest Guards all over the weekend giving extra security and FONA donates a small extra for them. Literally hundreds of Nairobi residents use the arboretum for recreation and they are reading notes on our new boards. There have been several substantial donations from individuals, organisations and the business community. Gifts of KShs 10,000 or more since July are recorded on a Donors Board, itself a donation from a furniture company.

For February 1995 we plan a musico-environmental event "Wind in the Trees", a suggestion from two local music teachers. They are organising school brass bands to play for the public. FONA hopes to make this a really special day to create awareness of the potential the Arboretum has for the whole community. It is a place already much loved by many Nairobi residents.

Our long term aim remains to have a Visitor-education centre, in line with modern arboretum developments elsewhere. The theme of the centre would be the natural forests of Kenya and a planting policy in the grounds should also pursue this aim. The generous donation by the Netherlands embassy of half million shillings in 1993 is not now sufficient to begin the first phase. However the groundwork for such a place to operate is being laid slowly but surely. We invite many more EANHS members to support our programme.

Please contact FONA P.O. Box 30158, NAIROBI. Visitors to the office may enrol as Friends there.

Erratum

Vol 24 (3), p 35, line 29: *Leucobryum viridissimum* should be *Leucobryum islaenum.*

MEMBERSHIP:
This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society-National Museum Library (postal borrowing is possible) and copy of the EANHS Bulletin every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

JOURNAL:
The Society publishes, in collaboration with the National Museums of Kenya, the Journal of East African Natural History. The Journal is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Editor, Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

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This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), Box 44486, Nairobi, Kenya. line drawings can be published. Photographs will be considered if they are re essential to the article.

SCOPUS:
The Ornithological Sub-committee publishes this journal three times a year, cost KSh. 250 per annum. All correspondence to D.A. Turner, Box 48019, Nairobi, Kenya.

BALLYA:
This bulletin is published three times a year by Succulenta EA, a division of the EANHS. Members of the EANHS can join Succulenta EA, at a cost of KShs 400 per annum, and receive *Ballya.* Contributions for *Ballya* can be sent to Edward Vanden Berghe, Box 44486, Nairobi, Kenya.

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*Full-time students (including university undergraduates) or children under 18.

Subscriptions are due on 1 January. From 1 July you may join for half the yearly subscription and receive publications from that date. Application forms for membership are obtainable from the Secretary, P.O. Box 44486, Nairobi, Kenya.

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Articles and Notes

TERMITE FAUNA OF RAMOGI HILL FOREST, NYANZA PROVINCE

The species belonging to the order Isoptera (termites) are widely distributed in the warmer regions of the world, particularly in the tropics where the subterranean termites form a significant element of the soil macrofauna. The food of termites is plant material, principally wood, though specialisation within the many genera has led to a wide range of feeding habits. Some termites feed directly on the wood of living trees, while at the other extreme there are those which depend on humus in the soil; some are able to digest dry timber and others need plant material that has already been broken down by fungi or bacteria.

Termites are generally regarded as serious pests: those that feed on the tissues of living plants can do significant damage in forestry plantations, orchards, field crops and pasture. Some species that do not attack living tissues may still exploit the heartwood of living trees, reducing the value of their timber and ultimately weakening the tree so that it becomes susceptible to breakage by wind or under its own weight. They may enter the tree through dead twigs, knot holes or damaged bark, or underground from the roots.

However, termites also play an important role in many ecosystems. The majority of termite species contribute to the breakdown and humification of dead plant tissues, and to the recycling of nutrients. In many dry forests, organic matter (wood and litter) decomposition depends mostly on termites, with fungal and bacterial decay playing a relatively minor role. Soil dwelling termites can be important in maintaining an open soil structure, and in reversing the downward leaching of soil nutrients by rain, but soil feeding termites may also reduce the humus content of soils.

THE STUDY AREA

Ramogi Hill in Western Kenya is a cultural forest which has survived as a pocket of tropical rain forest in an otherwise relatively dry and densely populated area. It is an island surrounded by the great Lake Victoria and the associated Yala River Swamp in the west and north, and a heavily populated settled area in the west and south (fig. 1). The forest is made up of two hills: Minyengjra (200 ha) and Nyaidi (83 ha).

The vegetation of Ramogi Hill can be characterised as upland dry forest. The dominant tree species are *Haplocoelum foliolosum, Strychnos trichocarpa, Teclea henningsii, Drypetes gernardi,* and *Monathotaxis* sp. The social norms and traditional beliefs of the local society about the hill had encouraged, enforced and limited exploitation of the hill's biological resources, but at present the forest vegetation has been greatly reduced through selective cutting, livestock roaming and the numerous footpaths running across the forest. Much of this disturbance is restricted to the peripheral parts, at the foot of the hills.

As a result of the present negative human influences in the Ramogi Hill Forest, the faunal diversity of the area is reduced. However, the arthropod fauna seems to have survived and adapted to the changing habitat, probably because the adjacent swamp, rivers, lakes and even Ramogi Hill itself provide

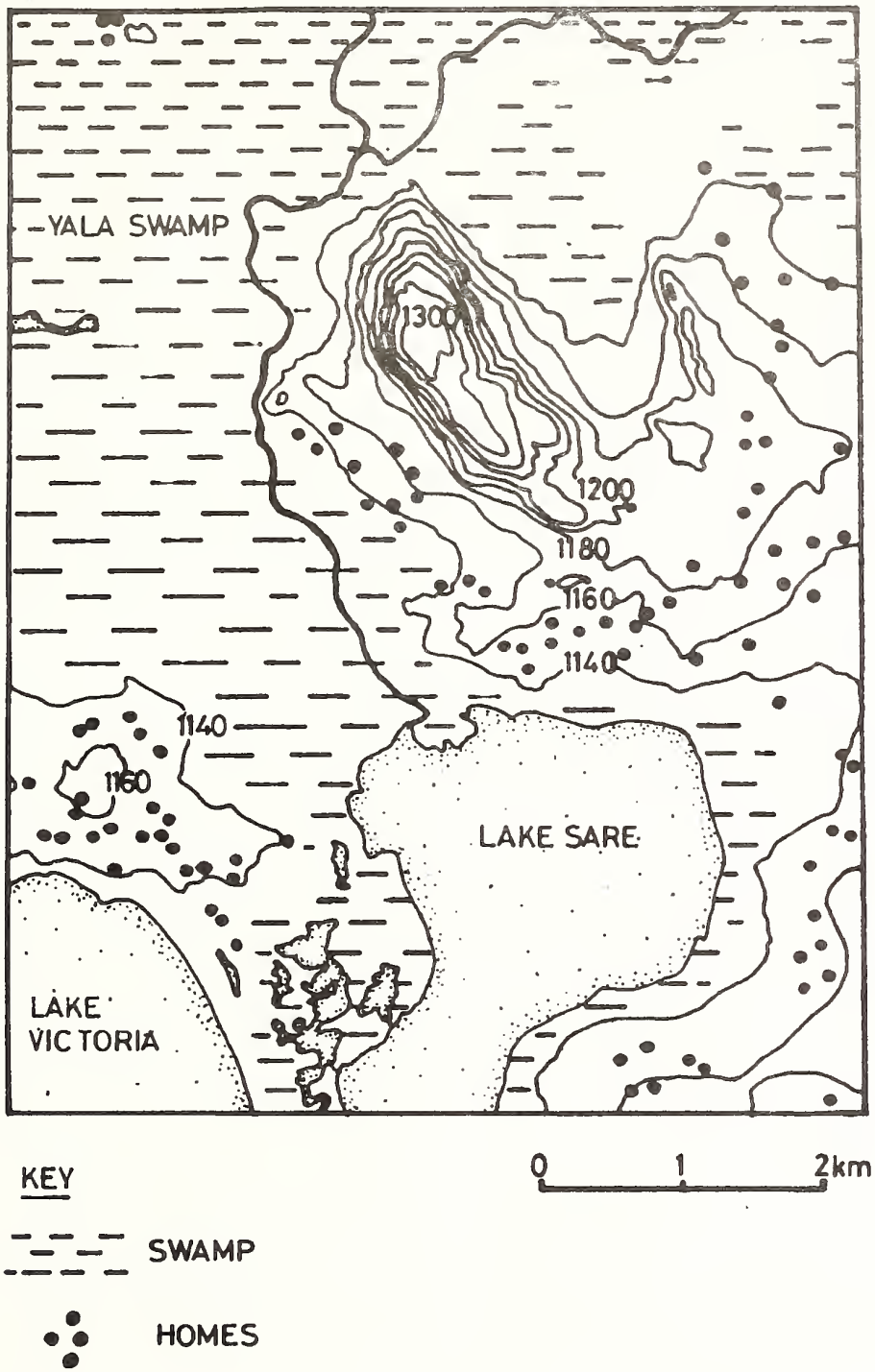

Figure 1: map of the study area

refuges for their survival.

The arthropods found in Ramogi Hill Forest are those associated with dry tropical forests. The list of the termites known to occur here is based on specimens in the National Museums of Kenya collection, and on field observations made during two multi-disciplinary expeditions to the forest (July/August, 1993 and September, 1994), sponsored by the African Academy of Sciences and the Earthwatch Group. Included in the list are seven genera of which five have been identified to species level. An annotated systematic list gives their descriptive characteristics (based on the soldier caste, and the mound/nest structure where possible), habits, and abundance and distribution.

ANNOTATED CHECKLIST

RHINOTERMITIDAE

These are small subterranean wood-eating termites, characterised by the habit of the soldiers, when alarmed, to exude a drop of sticky fluid from the fontanelle (an opening of the frontal gland).

Rhinotermitinae

The soldiers of this group of termites have elongated labrum with median groove, conspicuous fontanelle, mandibles usually robust, with large marginal teeth. In most genera there are two distinct classes of soldiers.

Schedorhinotermes lamanianus **(Sjöstedt, 1911)**

Soldiers are of two sizes, both with sharp marginal teeth on the mandibles, labrum comparatively broad, with bifurcate tip. These termites are known to built large but diffuse nests in the soil, and typically nest in dead decaying wood but sound timber, both in buildings and in extra-mural situations, is not immune to attack by these termites.

In Ramogi Hill Forest, they build characteristically medium sized channels and galleries, running from the base of live trees to hollow decaying parts of the tree. This particular termite species seemed to show some preference for the tree species *Haplocoelum foliolosum* (local name: 'mufundhwe'), but was occasionally found in association with *Boscia salicifolia* (local name: 'arin'go') or other trees. It was also recorded in a dead decaying tree log, that might have been attacked when still alive and standing. This species is abundant and occurs in nearly all parts of the Ramogi Hill Forest.

TERMITIDAE

World-wide, this family includes about 80% of the isopteran species. It is divided into four subfamilies, none of which can be classified exclusively as humus, grass or wood feeders. Some have highly specialised morphological and behavioural characters.

Termitinae

This is the largest subfamily, comprising 34 genera in the Afro-tropical region. Most of them are small humus feeders adapted to the tropical forest block and its extensions, but quite a few genera are distributed over the whole continent. Four genera belonging to this subfamily have been recorded in Ramogi Hill Forest, three of which have been identified to species level.

Amitermes spinifer **Silvestri, 1914**

These are small termites with hooked mandibles. They are known to build small carton nests on the ground and on stumps of dead trees. In Ramogi they build small raised mounds in the open parts and huge oval shaped mounds in closed areas, both on the ground and in dead rotting tree stumps. Most foraging parties were encountered within dead tree stumps, and this could be an indication that they enter the tree from underground and eat the stump from within. It

was also noted to be a very common termite in the forest.

***Microcerotermes masaiaticus* Harris, 1954**
This is a small termite which can easily be recognised in the soldier caste by the rectangular head capsule and the inner serration of the mandibles. Like most Termitinae it has centralised nests containing large numbers of individuals, which may be inside wood or in the soil. It forages extensively in the litter layer, and infests stumps of standing dead trees. It is a small termite and makes small galleries, lined with a thin layer of brown woody carton. It also builds characteristically small covered galleries of carton outside logs and tree holes, to give protection to foragers away from the nest. It often builds carton galleries inside larger ones left by other termites. It seems to be able to attack dead wood in almost any condition, sound wood to soft, well rotted wood. This is a very common termite in Ramogi, and is probably the most abundant in the forest. Nests were recorded in dead tree stumps, and both smooth and rough galleries on the trunks of several trees, shrubs and herbs in the forest.

***Basidentitermes aurivillii* (Sjöstedt, 1907)**
This is also a small termite which can be recognised in the soldier caste by the oval red head and white abdomen. Members of this species feed mainly on humus found in savannah woodlands; they also infest well-rotted moist wood litter and tree stumps. Their nest-like galleries have thick walls of dark grey soil (= faeces), sometimes in contact with a food source, but usually they live as small communities in the walls of other termite mounds. In Ramogi it was only encountered once inside a rotted moist tree stump, in the part of the forest that has not been disturbed (on top of the hill).

***Termes* sp.**
This is a genus of small termites whose soldiers have rounded-rectangular heads, inflated, and long fine mandibles with in-curved tips; the front margin of the labrum is cut off straight, or at most lightly rounded, and with projecting corners. It is known to occur in the tropical regions throughout the world. In Ramogi it was recorded from a nest attached to a tree base, and also foraging on a tree stump.

Macrotermitinae
This very successful subfamily contains all the fungus-growing termites, and occurs only in Africa and Asia. They build distinctive structures called fungus combs using their own faecal pellets in which the vegetable matter is largely undigested, and inoculate the combs with spores of a symbiotic fungus. The fungus breaks down the undigested vegetable matter into substances that the termites can assimilate. The fungus combs are housed in purpose-built chambers in the soil, sometimes widely dispersed, sometimes aggregated into elaborate centralised nest structures. The termites may bring in forage from considerable distance to build their combs. The symbiotic fungi can occasionally grow to the soil surface into big mushrooms (fit for human consumption). Two genera belonging to this subfamily were recorded in Ramogi Hill Forest.

***Macrotermes* sp.**
This genus include some of the largest termites. The soldiers are dark with a triangular head possessing mandibles without marginal teeth. The mounds are generally large, conspicuous and of ecological importance. Destruction of timber and dead vegetation may be spectacular if the enormous populations of individual communities are directed toward limited supplies. This termite was collected at the edge of the forest at the western fringe.

***Odontotermes kibarensis* (Fuller, 1923)**
This termite has soldiers with a marginal

tooth on both left and right mandibles. They are somewhat medium sized, with little mound building. Their feeding in wood and dead vegetation is of economic importance. In Ramogi it is a very common termite foraging on a wide range of vegetable substrate, such as live tree trunks (*e.g. Ochna ovata*; local name: 'amolo'), standing and fallen dead wood, or decaying wood. They were noted to make characteristically large galleries over their substrate.

DISCUSSION

The Ramogi Hill Forest harbours relics of ancient and remaining arthropod species isolated from the rest of the tropical forests. The forest termite fauna as it is known at present is predominantly that of the dry tropical forest.

Rare and unidentified termite species have been reported in Ramogi Hill Forest. The genera *Basidentitermes* and *Termes* collected from Ramogi have only been recorded in the remaining tropical forests in East Africa such as Kibale Forest in Western Uganda (Darlington and Ogutu, July 1994), Shimba Hills at the Kenyan coast, (Darlington, October 1994), and Kakamega Forest in Western Kenya. These species are probably relics of the Tropical Forest which was formerly more extensive. Although they seem to be rare in East Africa (this is the first published record of the presence of the genus *Termes*), they do seem to be widespread also on the eastern part of the continent: records have been published from Somalia, Ethiopia, Sudan, Malawi, Zimbabwe and Mozambique.

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GROWTH FORMS OF BRYOPHYTES FROM MT KENYA

Growth form is defined by Meusel (1935) as the overall character of a plant that can only be determined by detailed morphological analysis. Each moss shoot has a genetically fixed method of ramification, depending on species, genus or family. The various growth forms that are present in bryophytes from Mt Kenya are closely related to the physical factors of the environment, light and humidity. Following are examples of the diverse growth forms from Mt Kenya; the classification follows Richards (1984) with modifications.

A. Social forms. This is where the leafy shoots or thallus branches are aggregated.

A1. Cushions. The shoots are mainly erect and they radiate outwards to form dome-shaped masses.

A1a. Large Cushions. One type is represented by large cushions measuring more than 5 cm. in diameter. On Mt Kenya this growth form is found from the montane forests to the upper alpine zone. *Leucobryum isleanum* Besch. var. *molle* (C. Mull) Card. cushions are light-green, measuring 6 to 10 cm wide and 2 to 3 cm high. They grow mainly in the very wet southern to eastern part of the mountain between 1750 and 2475 m, in the lower montane vegetation belt on forest floor, on rotting dead wood. At a higher altitude, between 3000 and 3300 m we find cushions of a more conspicuous nature. Here too, in the upper montane forest belt, or "mossy" forests, precipitation is high, cloud and mist are frequent and the temperature is relatively low, so that litter decomposition is slow, humus and debris of all kinds accumulate on branch forks and on large more or less horizontal branches, creating some kind of "sols suspendus" which become ideal habitats for the establishment of large cushions of

Antitrichia kilimandscharica Broth. These mosses grow luxuriantly on the big branches of *Hagenia abyssinica* (Bruce) J.F. Gmel. or African Rosewood.

In the upper alpine zone between 4200 and 4490 m this growth form is again encountered on the edge of Nanyuki Tarn and along streams in the head of the Teleki valley, where extensive cushions of *Aulacomniun turgidum* (Wahl.) Schw. are found to grow so firm that when they are trodden on, the foot does not sink into them. This growth habit predominates in areas of high humidity where water is abundant as in "mossy" forests and in the montane forests of high rainfall. In an area where there is low rainfall and where solar radiation is high (*e.g.* upper alpine belt) these mosses are abundantly present due to the fact that their bases are in permanently wet ground promoting capillarity and therefore do not suffer from desiccation.

A1b. Small Cushions. The second type of cushions are those smaller ones that measure less than 5 cm in diameter. In these, the shoots grow upwards and sideways so that a hemispherical shape is achieved. Good examples are the small hemispherical cushions of *Grimmia affinis* Hornsch. and *Andreaea cucullata* Dix. common on rock boulders from 3250 m to the summit of Batian 5199m in the upper alpine and nival zones of Mt Kenya. These small cushions are adapted to this low rainfall area or where precipitation is often in the form of hail or snow, coupled with intense solar radiation promoting desiccation. These mosses possess shoots that are crowded together thereby minimising water loss. Their leaf cell walls are thick and their leaf extremities are transformed into hair points adding to their water conservation strategy.

A1c. Round cushions or globular mosses. A third type is the "moss" ball or globular moss. At high altitudes between 3850 and 4450 m, there exist climatic conditions of alternate freezing and thawing. Small hemispherical cushions of *Grimmia affinis* Hornsch. growing on rock boulders, under the above climatic conditions, become detached from these surfaces and they fall to the ground where solifluction soil conditions do not allow them to grow in a given direction but in all directions so that we find globular mosses or "moss balls" where shoots radiate from a central point. This peculiar growth form has also been reported from Kerguelen Island in the Indian Ocean, in Iceland, on Jan Mayen Island, Amchitka Island and in the Norwegian Mountains.

A2. Tufts. Here the moss shoots are upright, with more or less parallel shoots

A2a. Tall tufts are mainly found in open areas in the lower and upper alpine areas. In these areas light intensity is high but since water is not a limiting factor the mosses develop long shoots that are often compactly packed so that water loss is limited to a minimum. Good examples are found in *Distichium capillaceum* (Hedw.) B.S.G., *Calliergon sarmentosum* (Wahl.) Kindb., *Campylopus jamesonii* (Hook.) Jaeg. and *Cratoneuron filicinum* (Hedw.) Spruce, all measuring between 4 and 7 cm in height.

A2b. Tall turfs with divergent or creeping branches of mostly limited growth are also found to grow abundantly in open areas where light and relative humidity is high in the environment. If not, tall turfs of *Sphagnum davidii* Warnst. are always found in bog-like conditions where the ground is almost permanently water-logged.

A2c. There are also short turfs where the shoots are less than 2 cm high. These mosses have short, upright shoots, growing closely together. Light intensity is high in the lower and higher alpine belt, thus preventing the development of long shoots in these areas of low and erratic precipitation. *Campylopus*

nivalis (Brid.) Brid. form extensive compact and short turfs.

A2d. Open turfs have shoots somewhat separated, these often springing from a persistent rhizoidal or protonemal system. We have here numerous *Fissidens* sp. growing on wet ground, stones, stream and river banks in the montane forest belt. Relative humidity is always high in the environment while light intensity is low. These shoots need not develop special adaptations as their environment is always saturated with water and their shoots are not closely packed but rather separated from each other.

A3. Mats. These are mosses with primary stems creeping horizontally over the substratum and where the lateral branches are erect or parallel, these branches are mostly limited in growth thereby forming closely interwoven mats.

A3a. There are rough mats having main shoots adhering to substratum. These shoots produce abundant short erect laterals. This growth form is encountered frequently in the humid montane forests where rupicolous *Sematophyllum brachycarpum* (Hampe.) Broth. and the lignicolous Se*matophyllum dregei* (C. Mull). Bartr. are numerous. At higher altitudes in the lower and higher alpine region where dry climatic conditions prevail, mat forms of rupicolous *Racomitrium sebsecundum* (Hook. & Grev.) Mitt. & Wils. possess hair points at their leaf extremities to prevent excessive water loss.

A3b. Smooth mats produce closely interwoven branches in the same plane as the main shoot. They usually creep on the host branches. *Radula recurvifolia* Steph. *Frullania arecae* (Spreng.) Gott., *F. schimperii* Nees and *Cheilolejeunea pluriplicata* (Pears.) Schust., all grow on the branches and twigs of *Erica arborea* L., the giant heather. As the rainfall is erratic on the *Erica* woodland these bryophytes have developed special organs for water storage which include the development of water sacs and thick-walled cells that minimise water loss.

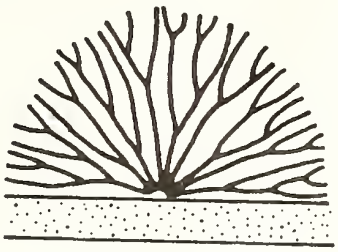
A3c. Thread-like forms have delicate creeping branches which are also sparingly and irregularly branched. Epiphyllous bryophytes often show this growth form as can be seen in *Odontolejeunea lunulata* (Web.) Schiffn. and *Cololejeunea runssorensis* (Steph.) Pocs. These are commonly encountered on leaves of forest trees growing in the very wet southern and south-eastern lower montane forests.

A3d. Thallose mats are represented by the thallose hepatics, *Metzgeria hedbergii* Vand. Bergh., *Dumortiera hirsuta* (Sw.) Nees., *Marchantia polymorpha* L. and *Asterella linearis* (Steph) Howe. These grow, at low altitudes, under low light intensities, on the ground, under the forest canopy and at higher altitudes, on permanently wet ground or on rock surfaces along stream and river banks.

A3e. Wefts have the main and lateral shoots growing loosely through one another and they form a covering which is easy to lift from the substrate. This growth form predominates in open forest margins where relative humidity is high throughout the day *e.g. Thuidium matarumense* Besch. and *Hylocomnium splendens* (Hedw.) B.S.G. in the montane forest belt.

B. Solitary forms of bryophytes are those whose leafy shoots or thallus branches are not closely aggregated.

B1. Terrestrial unbranched forms. These acrocarpous bryophytes grow commonly in the montane forest belt where humidity is always high, coupled with frequent cloud cover, and with water seeping through the ground on which they grow therefore



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A1b

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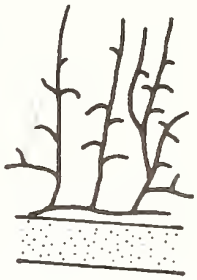
A2a



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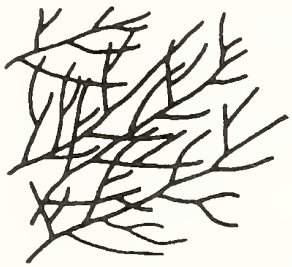

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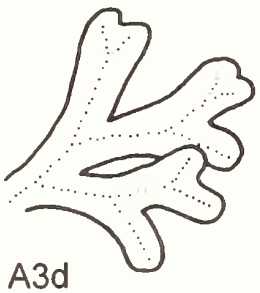

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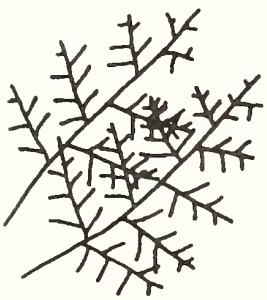

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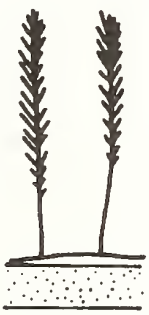

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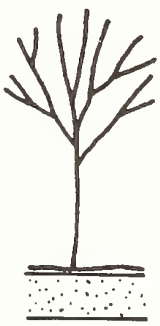

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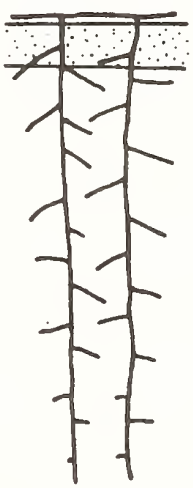

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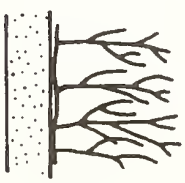
B3



B4

providing ample water supply to their rhizoidal systems. Here light intensity is moderate producing luxuriant growth of *Pogonatum gracilifolium* Besch., *Pogonatum perichaetiale* (Mont.) Jaeg. ssp. *oligodus* (C. Mull.) Hyvonen and *Polytrichum commune* Hedw. on vertical faces along road cuts.

B2. Dendroid, non-dorsoventral forms. This type of solitary bryophytes can be either epiphytic or terrestrial. The stems are branched, and branching is not dorsoventral (*i.e.* in one plane). They are also moisture-loving, growing in dim light in the montane forests. *Porothamnium stipitatum* (Mitt.) Touw ex. DeSloover, *Symphogyna podophylla* (Thumb.) Nees. & Mont. and *Pallavicinia serrata* (Mitt.) Grolle flourish on stream and river banks holding their leaf surfaces vertical, to the direction of light. Their leaf cells are delicate and thin-walled and are not adapted to conditions of desiccation.

B3. Feather growth forms. In these mosses, the secondary stems are more or less pinnately branched and are dorsoventral. They prefer moist shady conditions under the forest, requiring a dim light, holding their leaf surfaces horizontal to obliquely downwards. *Hypopterygium viridissimum* C. Mull. is present on rotting tree trunks under the forest while *Prionodon ciliatus* Besch. and *Plagiochila squamulosa* Mitt. are epiphytic.

B4. Bracket growth forms have horizontal shoots. They are predominantly epiphytic and are abundant on lower tree trunks where humidity is high but sometimes there is a period of drought. During this time the entire shoot curls up to reduce water loss e.g. *Leptodon smithii* (Hedw.) Web. & Mohr. and *Neckera platyantha* (C. Mull.) Par.

B5. Finally, there is the hanging bryophyte growth form where the stems creep on the twigs and these stems eventually produce long secondary stems (that hang down) which in turn produce short tertiary branches of limited growth. The growth form of hanging mosses is due to the action of water. The growing tip is frequently moistened by falling rain water and therefore grows almost without interruption. These hanging mosses sometimes are half a metre long.

Therefore, the presence, quantity and quality of light and humidity determines the growth forms that predominate in a given environment. And the structural adaptations of bryophytes increase their ability to hold capillary water so as to extend the period during which the plant can remain metabolically active.

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Upland Kenya Wild Flowers, Second Edition, is out! This second edition reflects the work that has been done on the vegetation of Central Kenya, and contains about five percent more species and 20 percent more localities than the first edition.

The second edition is authored by Andrew and Shirley Agnew, and published by the EANHS. It is available from the Society's office.

THE ECOLOGY AND PLANT DIVERSITY OF SEASONAL WETLANDS NEAR CARNIVORE RESTAURANT IN LANGATA, NAIROBI

Nairobi city owes its existence to the presence of wetlands. The springs, streams, and swamps guaranteed a supply of fresh water as the railway was made, a camp was built, growing into the city. However, most of the wetlands have been drained with the expansion of the city, while the few patches remaining have been converted into agricultural land. A wetland as defined in the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat includes "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres" (Dugan, 1990). This article discusses the ecology of the seasonal wetlands near Carnivore Restaurant, especially the seasonal changes in relation to plant adaptation, and examines the value of conserving the site.

South of the city centre in Langata area, between the Uhuru monument on Langata Road, Carnivore Restaurant, and Nairobi National Park, is a hillside with a bushy grassland interrupted by wetland habitats, consisting of rocky outcrops, seasonal pools, springs, and riverine marsh, rich in biodiversity. This is one of the sites selected, by the Kenya Wetland Working Group (KWWG) of the East Africa Natural History Society, for the Wetland Inventory Pilot Project.

Fauna recorded here include crustaceans, insects, amphibians, reptiles, birds, small mammals, and bigger mammals such as Bohor reed buck. The wetlands produce vital food for birds and mammals during breeding and migration seasons, and over 225 species of birds have been recorded at this site (Ng'weno, 1992; Ng'weno & Ng'weno, 1992). Floral diversity at these wetlands is high, though little literature exists on the plants present and their ecology.

Materials and methods

The seasonal wetlands consisting of rock slabs, seasonal pools, seasonal springs, and riverine marsh, were visited at different seasons, between September 1993 and February 1995. Observations were made on habitat seasonal changes and the corresponding plant habits. Herbarium specimens of all vascular species present were collected and later identified at the East African Herbarium in the National Museums of Kenya by the authors of this paper. A checklist of the plants, comprising over 350 species in 68 families, will soon be published by the East Africa Natural History Society.

Results and Discussion

The wetlands on this site consist of a remarkable diversity of micro-habitats that support a diversity of plants comprising various life forms. There are four major wetland micro-habitats, namely rock slabs, seasonal pools, seasonal springs, and riverine marsh, that will be dealt with separately.

Rock slabs

The rock slabs, formed from porous volcanic ash, may be bare or covered by a shallow layer of soil. For part of the year, the slabs are dry and have little vegetation cover except for lichens and succulent species. The rock slabs easily turn into pools after a shower but also dry out quickly.

Water is available within a short period and plants colonising the rock slabs are adapted to complete their life cycle within the short growing period. Depending on the techniques the plants have evolved for

maintaining themselves during the dormant periods, the various life form categories recognised by Raunkier (McNaughton & Wolf, 1973) are observed.

Therophytes, like the sedge *Fuirena leptostachya* Oliv., are annuals which complete their life cycle in one growing season and spend the dormant periods as seeds. The perennials and biennials have evolved various mechanisms for surviving the dry periods. Several small pockets on the slabs have relatively deep soil which supports shrubs, the phanerophytes, like *Grewia tembensis* Fres. Most of the rock slabs have very shallow soil, supporting plants with other life forms, including chameophytes, hemicryptophytes, and cryptophytes. Chameophytes, like the succulent *Euphorbia brevitorta* Bally, have buds very close to the ground but still aerial. Such plants have anatomical and physiological mechanisms for preventing desiccation during periods of drought, for example many have greatly reduced leaves and stems are photosynthetic. Hemicryptophytes, like the grass *Microchloa kunthii* Desv., have buds at the soil surface and all aerial portions die back to these buds during the dormant period. Cryptophytes, like lilies and sedges, having their buds buried in the soil in the dormant period dominate the rock slabs.

Rare and endangered plant species have been recorded at the rock slabs. *Brachystelma lineare* A.Rich., a plant found in shallow soil whose flowers smell like cow dung, is present as a single plant growing in a tuft of grass though once common but perhaps has been reduced either by being dug up by collectors or habitat destruction like dumping of soil. This species is rare (Agnew & Agnew, 1994), and Herbarium records show only one other site where it has been collected. *Drimia calcarata* (Bak.) Stedje, a cryptophyte, is local and rarely collected in shallow-soil grassland. This species, only known from around Nairobi, is currently recorded only from this wetland as other sites where it was previously recorded have been developed into housing projects. *Euphorbia brevitorta*, a densely tufted succulent with short unbranched spiny stems from a fleshy tuber, is locally common on the slabs. This endemic species is recorded from only three sites in Kenya, where it grows in rock crevices on exposed sloping usually swampy ground with free drainage (Carter, 1988), and is endangered (WCMC, 1993).

The rock slabs and rock pools play a role in slowing down the force of runoff water after rains, thus reducing erosion. The pools are an important source of drinking water for birds and other animals especially during the breeding and migration seasons, and are a habitat for plants adapted to the extreme fluctuations of water logging during rains and high temperatures with high evaporation rate leading to drought during dry seasons. However, part of the rock slabs, including the spots where the rare and endangered species are, is situated in the zone where the planned Nairobi by-pass road of the Trans African Highway is to pass.

Seasonal pools

A number of hollows or depressions occurring in this area fill up with water during rains. These pools are either natural or artificial; artificial pools have resulted from activities such as murram excavation and motor vehicle tracks. The pools differ in size, shape, substrate, and length of time in which they contain water.

The pools containing water for most of the year have a number of free floating, submerged, and emergent macrophytes. A small population of *Salvinia molesta* D.S. Mitchell, an introduced weed, floats freely in one of the pools. Common in many pools is a submerged macrophyte, *Aponogeton abyssinicus* A.Rich., which is submerged except for its floating leaves and purple flowers. A number of emergent species are observed, depending on the depth of the pool. These include sedges and grasses such as

Cyperus immensus C.B.Clarke and *Diplachne caudata* K.Schum., respectively.

Locally common in the ephemeral pools is an annual herb, *Crassula* sp. A (*sensu* Agnew & Agnew, 1994), only collected from this site. The pools are very rich in animal life. Amphibians and insects breed in pools, crustaceans live here, and the invertebrates provide food for birds, reptiles and mammals. The wildlife and livestock also drink water at the pools during the dry season. The pools act as reservoirs, for water draining into Hyaena Dam, a man-made dam, inside Nairobi National Park.

Seasonal springs

Rain water percolating through the rocks emerges as natural springs and seepage areas along the hillside. The springs produce a small but steady supply of water for most of the year. Some of the water collects into a semi-permanent pool at one site.

The muddy edges of the seasonal springs are covered with a mat of the creeping sedge, *Isolepis fluitans* (L.) R.Br., while other erect sedges, rushes and grasses are common. Some seepage areas are colonised by bulrushes, e.g. *Typha domingensis* Pers., shrubs, e.g. *Aeschynomene schimperi* A.Rich. and *Sesbania sesban* (L.) Merr., while others are characterised by the orchid *Habenaria chirensis* Reichb. f., and an assemblage of miniature wetland flowers; *Lobelia fervens* Thunb., *Nesaea erecta* G. & P., *Sebaea brachyphylla* Griseb. and *Utricularia arenaria* A. DC.

Riverine marsh

Water draining from the gently sloping wetlands collects into a shallow lowland and flows into Nairobi National Park. The lowland, with black cotton soil, includes the drainage dominated by riverine plant species such as *Cyperus latifolius* Poir., *Echinochloa pyramidalis* (Lam.) Hitchc. & Chase, *Phoenix reclinata* Jacq. and *Rhus quartiniana* A.Rich., and a flat area of seasonally flooded grassland.

The riverine marsh regulates the speed and quality of water flowing into Hyaena Dam in Nairobi National Park. Suspended soil particles and floating objects are trapped by the plant material in the marsh. The marsh is also useful in purifying sewage water, which occasionally overflows from the septic tanks, from a nearby restaurant.

Conclusions

The seasonal wetlands near Carnivore Restaurant are a unique site due to the diverse micro-habitats colonised by a rich diversity of plants-over 350 species, some of them rare, representing an equally remarkable diversity of life forms. These conditions attract a magnificent diversity of fauna especially insects, crustaceans, amphibians and birds. The grasses and sedges play an important ecological role in natural water purification.

The site is vulnerable to human destruction for development purposes, in particular the planned Trans-African Highway by-pass. The scenic, educational, and ecological value of this site is priceless. These wetlands are a small site with enormous environmental value and therefore deserve to be preserved.

Acknowledgements

Part of this work was conducted during the KWWG inventories. F. Ng'weno kindly provided moral and material assistance during several weekend visits to the site. Additional work was done while one of the authors (LOO) was a student in the Global Environmental Facility (GEF) sponsored 'Herbarium Techniques Course'. Additional visits by the other author (AMM) was part of field trips supported by the GEF and Kenya Museum Society. Valuable editorial comments were received from P.S. Masinde and F. Ng'weno.

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Request for Information

de Brazza's in Mt Kenya and Maralal

The curator of mammals of the National Museums of Kenya is preparing a check-list of primates in Kenya using data from both museum voucher specimens (local and overseas) and literature. During the exercise he came across information in literature that de Brazza monkeys occur in both Mt Kenya and Maralal. Both localities are very far from Mt Elgon and the Cheranganis where the species in known to occur. He would, therefore, like to appeal to whoever knows about the occurrence of the species in Mt Kenya and Maralal to inform him of the exact geographical locations where the animals were seen. He can be contacted through the EANHS office or at the Museum:

I. Aggundey
Department of Mammalogy
National Museums of Kenya
Box 40658, Nairobi

Short Communications

Sacred Ibis breeding at Busolwe, eastern Uganda

The Sacred Ibis, *Threskiornis aethiopica,* has been recorded breeding at several sites in Tanzania and Kenya. In Uganda, it has been recorded breeding at Murchinson Falls National Park and Massabea Island (Britton, 1980).

On 18 July 1993, Sacred Ibis were recorded breeding at Busolwe, Tororo District in eastern Uganda. The nests were in two 'mvule' trees, *Milicia excelsa (= Chlorophora excelsa).* One tree had 30 nests of Sacred Ibis and four of African spoonbill *Platalea alba* Scopoli. The second tree had 19 ibis nests and eight of the Black-headed Heron, *Ardea melanocephalus* Vigors & Children.

The sacred ibis is known to breed during the rainy season, but these were breeding during the dry season. Proximity to irrigated rice fields at Doho which provides suitable feeding areas throughout the year is probably the reason why they could breed during the dry season.

Busolwe is the only known breeding site for the African Spoonbill in Uganda

Julius Arinaitwe and Achilles B. Byaruhanga, Makerere University Institute of Environment and Natural Resources, Box 10066, Kampala.

Sighting of a Golden Cat in the Aberdare Salient

This is to record a positive sighting of a "Mau" Golden Cat in the Aberdare Salient on 1 December 1994, at 10:45 am. I believe there has not been a confirmed sighting on the Aberdares, and so I feel this will be of interest. I am familiar with this animal, having seen one on the Mau and two in southern Sudan.

A clear look at the rounded, not tufted, ears and the long tail, as opposed to the much shorter tail of a caracal with which I am also very familiar, eliminated any possible confusion. Colouration was a rich russet with spots low on the flanks—very similar to the skin that was on the wall in the Game Department Headquarters, Nairobi, many years ago and which was, if I remember correctly, taken from a Ndorobo on the Mau in the 1950s.

I would also like to record that my son, Martin Seth-Smith, together with "Sandy" Cameron were sure they too had seen one in the Salient. It walked slowly down the road in front of their car for 150 yards giving them a clear view.

A.M.D. Seth-Smith, Box 24818, Nairobi

Hornbills in Karen

From time to time, one or two silvery-cheeked hornbills (*Bycanistes brevis*) visit my garden just behind the Karen Shopping Centre or glide lazily overhead on their way elsewhere. In other areas of Nairobi I sometimes see a small party flying across the road, but never have I seen anything like the 30 or so that visited my garden one lunchtime in mid-January this year.

I didn't see them arrive, only being alerted to their presence by one or two that were suddenly visible from my veranda. These were only the outriders of the group, some only just old enough to fly, that were flapping and flopping through the forest behind my house. There were no fruiting or seeding trees to attract them, rather they just moved slowly and silently among the trees, poking into a nest or pecking seemingly without object at twigs and leaves. Sometimes five or six would gather together on a base branch before lurching off, one after the other, to their next perch.

They inspired in me a feeling of distinct un-ease—the avian equivalent of a black-leathered gang of urban idlers which must have terrified any smaller birds in their way. Mackworth-Pread & Grant comment that on Mt Kenya they are "regarded superstitiously by the natives and protected" and volume II of Birds of Africa records that at times they "aggressively hunt small animals, often in small parties, attacking roosting fruitbats or tearing up birds' nests in search of edible contents".

They soon moved on to my neighbour's garden—and a nearby friend told me they had visited hers earlier that day; but pity any smaller creature that found its territory invaded by those intimidating travellers.

Rupert Watson, Box 24251, Nairobi

Book Review

Flora of Tropical East Africa: Aloaceae, by Susan Carter. ISBN 90 6191 364 0. Pp. 60, incl. 14 text figs, + 4 colour plates, each with 6 photographs. A.A. Balkema, Rotterdam, The Netherlands, 27th August 1994. Price not stated.

The genus *Aloe* includes some of the most attractive indigenous succulent plants in East Africa. Formerly included in the *Liliaceae*, the aloes are now classified in the smaller segregate family *Aloaceae*, together with *Gasteria*, *Haworthia*, and four smaller genera in southern Africa and some Indian Ocean islands. When Gilbert Reynolds wrote his magnificent book *The Aloes of Tropical Africa and Madagascar*, published in 1966, he included 56 species for East Africa (Kenya, Tanzania and Uganda). He also mentioned several poorly known names based on plants collected in East Africa. In her account, Carter has 83 species, three of which have subspecies or varieties. Seven new taxa are described in the book, and there are several name changes, some associated with the poorly known names at the end of Reynolds' book. The familiar *Aloe graminicola*, which turns the hillsides around Gilgil red when in flower, is reduced to a variety of *A. lateritia*. Western populations previously referred to *A. lateritia*, in Uganda and the extreme west of Kenya and Tanzania, are now *A. wollastonii*. The charming miniature *A. dumetorum* is now *A. ellenbeckii*.

Following the familiar *FTEA* pattern, the text is concise but has a lot of detail packed in. Those used to working with the *FTEA* will know what is meant by "E.P.", "N.B.G.B.", and "P.O.A.", but the casual reader just buying the odd fascicle on a favourite group of plants must refer back to the Preface fascicle published nearly half a century ago. The distribution details, with "North Frontier Province" occurring frequently, also date back to the start of the *FTEA*, and presumably the continued use of these outdated geographical divisions is to maintain uniformity. The line drawings of 26 plants are of good quality, except that mature rosettes of *A. ruspoliana* do not have spotted leaves. There are also four colour plates, each with six species illustrated. To my knowledge, the only other *FTEA* fascicle with colour photographs is part 3 of the Orchidaceae. The inclusion of a colour photograph labelled "Aloe sp. (Unidentified)" is mystifying, until the connection with the note under *A. massawana* is realised. The identification key works well for the species with which I tried it out, though one can't get far without flowering specimens. Errors are very few and minor, the most glaring being the wrong authorship of the name *Aloe volkensii* on page 57 (shown correctly as Engler elsewhere).

Like most fascicles of the *FTEA*, this one was prepared at Kew, in the U.K. However, it is not the work of an armchair botanist, for the author has extensive field experience in Africa, including several visits to East Africa. Therefore this fascicle is the product of scholarly work on the literature and herbarium specimens, combined with a first hand knowledge of living plants in the field. It is not presented as the last word on East African aloes. As usual in *FTEA* fascicles, there are notes indicating remaining problems, the solution of which requires further field work, but as an account of current knowledge it will be an indispensable reference for everyone interested in the aloes of East Africa.

L.E. Newton, P.O. Box 43844, Nairobi

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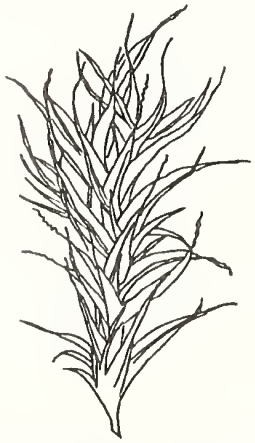
Articles and Notes

SUBSTRATA FOR BRYOPHYTES ON KENYAN MOUNTAINS

Bryophyte species often have a clear preference for a particular substrate type. Some of them are very selective: *Racomitrium subsecundum* and *Andreaea cucullata* are always found growing on rock surfaces, *Prionodon ciliatus* on trees, *Aulacomnium turgidum* on the ground and *Sematophyllum dregei* on dead, decaying wood. Others are less demanding, like *Chandonanthus hirtellus* var. *giganteus* and *Campylopus johnstonii*, which can be found on the ground or on trees. What follows is a list of some of the more important species that can be found on Kenyan mountains, classified according to their substrate preference.

Ground Bryophytes

A good number of bryophytes flourish on the ground. These 'terricolous' bryophytes are found in a variety of habitats. In the montane vegetation belt, terricolous bryophytes grow luxuriantly on wet ground near streams or along wet banks of rivers and streams. Especially abundant are the hepatics like *Dumortiera hirsuta, Marchantia polymorpha, Lunularia cruciata, Pallavicinia serrata, Symphogyna podophylla, Anthoceros myriandroecius* and *Asterella linearis,* cohabiting with mosses like *Fissidens*. The ground on which they are found is always wet and sometimes the bryophytes are under a continuous water spray as when they grow close to a waterfall. Species like *Polytrichum commune, Polytrichum piliferum, Pogonatum gracilifolium* and *Pogonatum perichaetiale* ssp *oligodus* thrive along vertical faces of roadcuts. *Sphagnum davidii* prefers bog-like conditions where the ground is permanently water-logged and acidic while *Funaria hygrometrica* is abundant on disturbed soils.



Racomitrium subsecundum

Some terricolous bryophytes often grow intermingled with others. *Breutelia stuhlmanii, B. gnaphalea, Hylocomium splendens, Thuidium matarumense* and *Hypnum cupressiforme* produce shoots that intermingle over one another. Above the tree line, the ground is often wet and extensive areas are occupied by moss shoots of *Campylopus nivalis, Leptodontium pungens* and *Aulacomnium turgidum* crowded together forming extensive tufts.

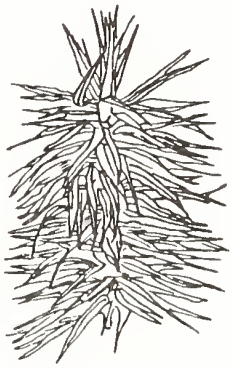
'Rupicolous' bryophytes are those that grow on rock outcrops, boulders and stones. Even the very small amounts of debris and dust that collect on these surfaces is utilised by the bryophytes. These rupicolous bryophytes are mainly mosses and rely on their structural characters to prevent desiccation. In the alpine belt, *Grimmia affinis, Andreaea cucullata, Orthtrichum rupestre, Braunia secunda, Racocarpus purpurascens* and *Racomitrium subsecundum* possess hair points at their leaf extremities and have thick cell walls. *Grimmia affinis* forms small compact hemispherical cushions with their shoots closely crowded together. Other species, which are not structurally adapted to avoid desiccation, occur on more

sheltered surfaces. Examples are *Amphidium tortuosum* and *Distichium capillaceum,* flourishing in caves and rock outcrops. At lower altitudes, rupicolous bryophytes of *Porothamnium stipitatum* and *Fissidens* species are usually found growing on wet stones along rivers and streams.

Tree Bryophytes

A characteristic feature of the tropical rain forest is the high incidence of epiphytes in the constantly high atmospheric humidity of the lower levels of the forest (Gradstein & Pócs, 1989). Epiphytic bryophytes are those that grow on other plants. In general these bryophytes are relatively specific in the position they occupy on their host. They can be divided into several categories. On the lower trunks of tall forest trees like *Podocarpus latifolius*, one can identify a 'moss-line' (Richards, 1984) below which bryophytes thrive abundantly in an atmosphere almost always saturated with water vapour. Above this line, bryophytes become scarce as the relative humidity of the surroundings decreases. This line is usually about a metre from the ground, but may vary depending on local conditions. Generally the bryophytes that are found below this line are not adapted to periods of desiccation. They shrink and die during prolonged droughts (*e.g. Plagiochila squamulosa*). Those that grow above the moss-line usually have thick cell walls in their leaves to reduce desiccation and they curl up their shoots to prevent further damage to their cells (*e.g. Leptodon smithii*).

There are extensive bamboo forests of *Sinarundinaria alpina* in the very wet southern to eastern sides of Kenyan mountains. In these forests, the main bamboo culms support a variety of bryophytes, like *Metzgeria consanguinea, Plagiochila squamulosa* and *Radula recurvifolia.* These creep over the smooth, wet surfaces of the internodes and nodes. *Atractylocarpus alticaulis*, *Macrocoma tenue* and *Bryum capillare* are found at the nodes of the small branches. *Leptodon smithii* and *Pterogonium gracile* are present on nodes of the bamboo twigs in drier regions. The tree-fern *Cyathea manniana* supports a rather limited number of epiphytic bryophytes like *Rhizofabronia persooni* var. *sphaerocarpa.* The pencil cedar *Juniperus procera* possesses a rough bark on its trunk and these surfaces are preferred by *Frullania hedbergii* and *Papillaria africana. Juniperus* grows in areas where relative humidity is rather low, so it supports few bryophytes growing on its bark. *Frullania hedbergii* are very small plants with water sacs in every leaf lobe; these sacs conserve water and, therefore, protect against desiccation. *Papillaria africana* has cells with thick cell walls, thereby reducing water loss.



Breutelia stuhlmanii

At higher altitudes, on the large branches of trees of *Hagenia abyssinica,* huge thick cushions of *Antitrichia kilimandscharica* develop under an environment of frequent cloud and mist, often referred to as 'mossy' forest or 'elfin' forest. Above the forest belt of our mountains, rainfall decreases and is erratic giving rise to an ericaceous woodland dominated by giant heather *Erica arborea.* The crooked branches of this small tree provide refuge to a variety of mat-forming hepatics like *Frullania arecae, F. schimperii, Cheilolejeunea pluriplicata* and *Radula recurvifolia*, and an abundance of mosses

such as *Zygodon intermedius, Campylopus johnstonii* and *Macrocoma abyssinica*.

'Epiphyllous bryophytes' are those that grow on living leaves. These epiphytes are present in very humid lower montane forests. On our mountains they are poorly represented; only a few specimens of *Odontolejeunea lunulata, Cololejeunea bolombensis* and *C. ruensorensis* are found.

Bryophytes on fallen trees, branches and twigs are initially those associated with the epiphytes that are growing there. These are eventually replaced by other species when the dead wood rots. These 'lignicolous' bryophytes include several species in the genus *Sematophyllum, Hypopterygium viridissimum* and *Leucobryum isleanum* var. *molle*.

Conclusion

The Kenyan mountains present a variety of substrata for bryophyte establishment. The epiphytes contain the greatest diversity of species in the montane forests as the habitats available for establishment are the most varied. Terricolous species are most abundant above the tree-line in our mountains while rupicolous species are present mainly in the upper alpine and nival zones.

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Min S. Chuah-Petiot, Botany Department, University of Nairobi, Box 14576, Nairobi, Kenya.

ORCHIDS OF EAST AFRICA: SOME STATISTICS ON THEIR DISTRIBUTION

As a first step in computerising the East African Herbarium (EA), all information contained in the Flora of Tropical East Africa (FTEA) is being logged. One of the first families to be entered was the Orchidaceae, since they are the subject of a special conservation programme for the Plant Conservation and Propagation Unit (PCPU), based at the EA. The 'Check-list' for orchids is now finished, and has been carefully proofed for typing mistakes, both against the FTEA itself (Summerhayes, 1968; Cribb, 1984, 1989) and against *Vascular Plant Families and Genera* (Brummitt, 1992). Furthermore, all author names were updated using the newly set standard by Brummitt & Powell (1992). The distribution for neighbouring countries has been completed using those floras more recent than FTEA that were available to us, such as *Flore d'Afrique Centrale* (Geerinck, 1984, 1992) and *Orchids of Malawi* (La Croix *et al.*, 1991). The check-list is being used as a standard species list while entering specimen information.

Species distribution

The orchid family is subdivided into several tribes, four of which are represented in East Africa. The Orchideae is a tribe consisting almost completely of ground orchids. There are 15 genera and 253 species in this tribe; some well-known genera are *Holothrix, Habenaria, Disa* and *Satyrium*. The Neottieae is the smallest of the four tribes,

having eight genera and 11 species, all exclusively terrestrial. The genus *Epipactis* is probably the best known of these. The Epidendreae contain 21 genera, including *Vanilla, Bulbophyllum, Polystachya, Ansellia* and *Eulophia*. There are 247 species in this tribe which are either terrestrial or epiphytic. The four species of *Vanilla* are all climbers. The only species in *Ansellia* is *A. africana*, the leopard orchid; this species is usually epiphytic, but occasionally occurs as a terrestrial or lithophyte. Lastly, the Vandeae have 28 genera, amongst which are *Aerangis, Diaphananthe, Microcoelia* and *Tridactyle*. All 178 species in this tribe are epiphytic.

Table 1. Number of orchid species per country, and total for East Africa

Tribe	K	T	U	Total
Epidendreae	81	189	121	247
Neottieae	4	10	7	11
Orchideae	91	215	84	253
Vandeae	77	123	92	178
Total	253	537	304	689

The FTEA lists 689 species of orchids as occurring in East Africa: 253 of these are represented in Kenya, 537 in Tanzania and 304 in Uganda. The distribution over the three countries, separated by tribe, is given in table 1; an overview of the totals per country, and the number of species shared between different countries, is given in figure 1. Four species have been described as "from East Africa", in older literature, and hence cannot be placed in figure 1; they account for the difference in the totals between figure 1 and table 1.

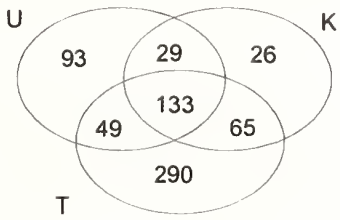

Figure 1. Number of orchid species unique to each country, and shared between different combinations of countries

Table 2. Comparison of number of species in three taxa, per 1,000 km²

Taxon	K	T	U
Mammals	0.65	0.36	1.42
Diptera	4.55	2.49	10.65
Orchids	0.43	0.57	1.28

Table 2 lists the number of orchid species per surface area of the three countries. The figures can be compared for the same information for Diptera and mammals, listed in the same table (De Meyer *et al.*, 1994; Gathua & Vanden Berghe, 1993). For each of these three taxa, Uganda has the highest species richness per surface area. For the two animal taxa, Kenya is about twice as rich as Tanzania; for orchids, however, Tanzania is slightly richer.

Figure 2 shows a map of the Floral Regions of the FTEA; the dot density represents the species diversity per surface area of the floral regions. 'Floral regions' are not based on any biological or environmental reality: they were defined on the basis of administrative units when the work on FTEA was started. The administrative units in the three countries changed in the course of the years, but the original floral regions have been used consistently for all flora parts. Though less than ideal for this purpose, they give a rough picture of patterns of species distribution and diversity.

Regions of high richness are U2, T3, 6, 7, 8, and K3. Bwindi Impenetrable Forest and the Ruwenzori and Virunga Mountains undoubtedly contribute to the high score for U2. Most of the diversity in T8 seems to be contained in the Songea region. T7 contains the Southern Highlands with the Udzungwa

Mountains, Kitulo and Mufindi Plateaus, all known areas of high diversity. The same is true for the Uluguru Mountains and other nearby ranges in T6. The Eastern Arc Forests in T3 are recognised as areas of exceptionally high diversity. A further factor contributing to the high score for T3 is the past location of the East African Herbarium in Amani, resulting in a high collection effort in that area. The highlands on both sides of the Rift Valley (Mount Kenya, Aberdares, Mau, Cherangani, Mount Elgon) explain the high diversity in K3.

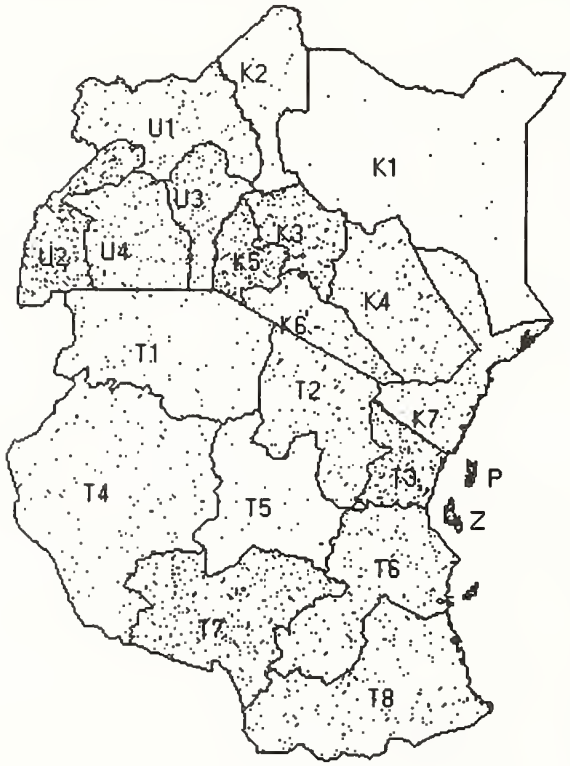

Figure 2. Map of the floral regions of FTEA. One dot represents one species; dot density is thus scaled to area of floral region

Table 3. Comparison of endemism in East Africa. 'Endemic fraction' is calculated as number of endemic species, divided by total number of species present in the country

Measure	K	T	U
Endemics/1,000 km²	0.024	0.126	0.105
Endemic fraction	0.056	0.221	0.083

Patterns of endemism

There are 212 orchids endemic to East Africa. Kenya has 14 endemics, Uganda 25 and Tanzania 118 (of which two are endemic to Zanzibar Island). These figures are not absolute and are subject to our incomplete understanding of both taxonomy and distribution of the orchids. Several species are only known from the type collection and hence automatically show up as endemics. It is possible that some are not true species but represent mutants or hybrids. Some species have been wrongly described on the basis of a single doubtful specimen; this was the case for *Polystachya coelogynochila* Kraenzl., which is based on a composite type made up of the vegetative parts of *Polystachya cultriformis* (Thou.) Sprengel and the inflorescence of an Asian *Dendrochilum* (Cribb, personal communication).

The figures of table 3 should be read with the above caveat in mind. The first line gives the number of endemic species per 1,000 km², the second the fraction of species present that are endemic. Tanzania scores highest on both measures. Uganda approaches Tanzania in its species count per

Table 4. Number of endemics per floral region. Regions not shown have no endemic species

Tribe	K1	K4	K5	K7	T1	T2	T3	T4	T5	T6	T7	T8	Z	U1	U2	U3	U4
Epidendreaea	1		2	3		1	8	1		14	9	1	2		6	1	1
Neottieae										2	1						
Orchideae		2	1			3	3	1	2	3	14	3			2	1	
Vandeae		1			1	1	7			6	8			2	7		
Total	1	3	3	3	1	5	18	2	2	25	32	4	2	2	15	2	1
Endemic fraction	.06	.03	.02	.04	.01	.05	.11	.01	.10	.17	.10	.02	.07	.03	.07	.02	.01

unit·area; the fraction of endemics is more similar to the Kenyan one, reflecting the high number of species shared with Zaire.

The number of endemic species per floral region are given in table 4. Four regions with high species counts have the highest number of endemics: U2, and T3, 6 and 7. Scaled to the number of species present, region U2 drops to a more moderate score (endemic fraction in table 4). T5 and K1 both have very low species counts (21 and 18, respectively; apart from K2, with also 21 species, only Pemba Island with 14 is lower); the number of endemics among these species is relatively high.

Conclusion

The present study is based solely on the information contained in FTEA. New information has become available since the publication of FTEA. Furthermore the list of orchid specimens at the EA will soon be available in electronic form. This will allow us to carry out a much more in-depth study. However, it is unlikely that there would be major changes in the trends outlined here.

It is also clear that certain areas require more attention. The number of species reported from K1 and 2, and from T1, 4 and 5 will probably increase with further collection. The number of endemic orchid species in Tanzania is very high and will even increase when less intensively collected areas receive further investigation.

Acknowledgements

Compilation of the checklist was a team effort involving members of the Plant Conservation and Propagation Unit and the Database Unit of the Centre for Biodiversity; it is impossible to list all the individuals who have contributed at one point or another. However, we feel that both Elizabeth Muthuma and Margaret Omoto deserve special mention.

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Edward Vanden Berghe, Centre for Biodiversity, and Benny Bytebier, Plant Conservation and Propagation Unit, NMK, P.O. Box 40658, Nairobi

Field trip reports

BOTANISING AT WAJEE CAMP BIRD SANCTUARY

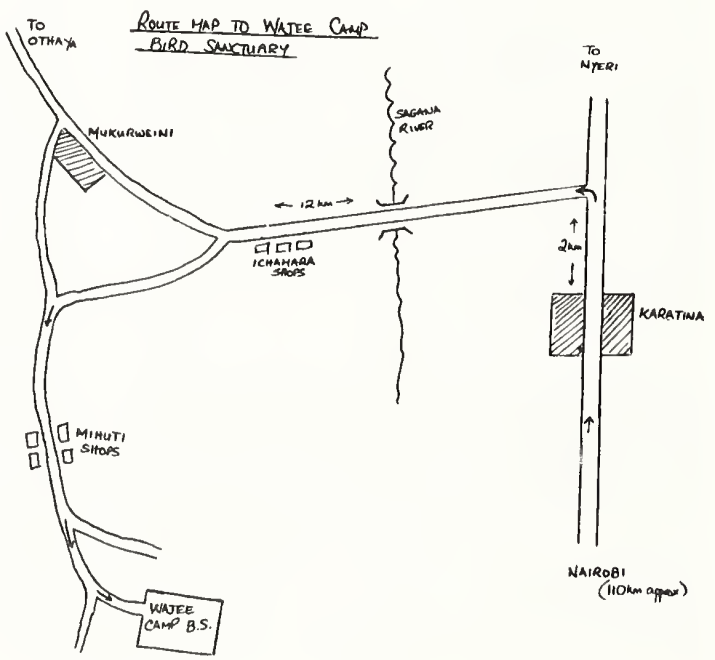
On the weekend of 18–19 March I went botanising at the Wajee Camp Bird Sanctuary in company of Jagi Gakunju and the camp guides. For six hours we enjoyed collecting herbarium specimens and information on plants. We were able to see the rich avifauna, including the African Wood Owl and the Hinde's Babbler.

The camp, located 160 km north of Nairobi and between Mt Kenya and the Aberdares, comprises of 10 hectares of remnant upland moist forest. The vegetation is rich in plant diversity, stratified into three layers, the canopy, shrub and herbaceous cover, consisting of both indigenous and introduced species. Species representing the once extensive natural forest include *Albizia gummifera* (J.F. Gmel.) C.A. Sm. (*mukurue*), *Newtonia buchananii* (Bak.) Gilb. & Bout. (*mukui*), *Rhamnus prinoides* L'Hérit. (*mukarakinga*), *Olea europaea* L. (brown olive), *Juniperus procera* Endl. (pencil cedar), *Myrianthus holstii* Engl. (giant yellow mulberry), and *Prunus africana* (Hook.f.) Kalkm. (red stinkwood). Exotic species, established in the early 1950s for agricultural value, include *Mangifera indica* L. (mango) and *Coffea arabica* L. (coffee). The recent tree planting initiative, one of the activities campers are invited to, has a conservation approach, focusing or rare, endangered and endemic species. Among planted trees showing good growth is the over-exploited Meru oak, *Vitex keniensis* Turrill. The population of Meru oak in the Mt Kenya region is rapidly decreasing due to the insatiable demand for its excellent timber, and such planting activities should be encouraged to save this species from threat of extinction.

A notable shrub is *Lantana camara* L. (*mukigi*) which colonises patches of land once planted with coffee. This introduced species, though a serious weed in some parts of Kenya, provides feed for a number of birds, including the Hinde's Babbler. Herbaceous vegetation is also diverse. At the campsite, striking plants include the sensitive mimosa, *Mimosa pudica* L., and a yellow-spiked sedge, *Cyperus hemisphaericus* Boeck.

Within six hours, we were able to record a rich diversity of plants, with 114 species in 49 families identified. A list of plants has been prepared and is available at the camp, while plans are underway to prepare a brochure on plants and a reference herbarium.

Abraham M. Muasya, East African Herbarium, P.O. Box 45166, Nairobi.



Field Trip to Wajee Camp Bird Sanctuary, 27–28 May, 1995

On the weekend of 27–28 May, a group of 17 members from EANHS and Uvumbuzi Club went to Wajee Camp, Mihuti Village, Nyeri District. The Camp lies 130 km north of Nairobi (100 km as the crow flies) in the Nyeri Valley, the undulating beautiful land between Mt Kenya and the Aberdares. It covers 10 hectares of unspoilt natural forest, which was set aside for conservation by the late Reverend Wajee. On Saturday 27th, we visited a farmer in the neighbourhood who is practising organic methods learnt through Uvumbuzi Club and the Kenya Institute for Organic Farming. The evening meal was traditional Kikuyu food and a few members had *muratina*, the traditional honey brew of the Kikuyu. On Sunday 28th, there was an early morning bird walk on the 1.5-km nature trail. We saw the African Wood Owl, Holub's Golden Weaver, Green-headed Sunbird and Robin Chat. The record kept in the main house has previous sightings of Hinde's Babbler, Narina's Trogon, Montane White-eye, Wire-tailed Swallows, Verreaux' and Long-crested Eagle, Red-chested Cuckoo and Hartlaub's Turaco. In the evenings you can hear the Nightjar calling "Ĩ ihĩ ĩ ti irimũ ! (oh how foolish little boys are!)". The only small mammal we saw was the bush squirrel, the only reptile Three-horned Chameleon.

Among the tall trees, we saw nests of Harrier Hawk (though no Harrier Hawk). A tree-planting event by the members, in which over 20 different species of trees were planted, concluded our stay there. On the return journey to Nairobi, during a stop-over at one of the flood-plains of the Tana River, we saw Cattle Egret, Sacred Ibis, Crowned Crane and Yellow-crowned Bishop.

Our thanks to Jagi Gakunju from Uvumbuzi Club for his kind hospitality.

For booking, contact, Tel: 017-60359 Nyeri or Great Expectations Ltd, P.O. Box 10788 Nairobi or Tel: 02-226770, 213840, 561243 or Fax: 226584.

Shailesh Patel, P.O. Box 26106, Nairobi

Request for Information

BREEDING OF CORMORANTS

I am currently studying the comparative ecology and breeding biology of the Great and Long-tailed Cormorant at Lake Naivasha. The primary aims of this study are better to understand recent population fluctuations and breeding patterns of these top predators, and to assess their potential as indicator species for the overall health of the lake ecosystem. The Long-tailed Cormorant, for example, suffered a 64% decline from January 1993 to January 1995, and there were recently less than 100 individuals on the Lake. Just as puzzling, the breeding pattern of the Great Cormorant has been quite erratic, with fairly large breeding colonies in some years of high lake levels and very little breeding in other years.

Any information you may have regarding present and especially past breeding activity by either of the species in the vicinity of Lake Naivasha would be greatly appreciated. I am particularly interested in knowing when breeding occurred (month and year), where (including a brief description of the breeding site), approximately how many nests were noticed and whether there were any other species breeding at the same time in the same location. All letters will be acknowledged. Many thanks.

Brooks Childress, P.O. Box 1497, Naivasha

KILIMANJARO BUTTERFLIES

I am currently preparing an annotated checklist on the butterflies of Mt Kilimanjaro and the surrounding area, which includes the cultivated areas and woodland, as well as the Rau and Kahe Forest Reserves. Any records from this area for inclusion will be greatly appreciated and acknowledged. Please send details on species, locality, date, altitude, status and habitat to my address, given below.

Norbert J. Cordeiro, 3145 South Canfield Avenue #13, Los Angeles, CA 90034, USA.

Short Communications

YOUNG VERVETS AND SYKES' MONKEYS PLAYING TOGETHER

Both vervets (*Cercopithecus aethiops*) and Sykes' monkeys (*C. mitis albogularis*) regularly feed and rest in our yard in Kilifi, bordering the north side of the Creek. I have often watched the young of each species playing, but as the vervets tend to avoid the Sykes', I had never seen the two species together, nor had I ever seen Sykes' monkeys playing on the ground.

On 9 April, 1995 at about 7:40 h I saw three medium-sized juvenile vervets playing in a part of the garden which is fairly open but backed by a dense patch of bush. They were playing under a tall tree with several other fairly tall trees with low branches nearby. I stopped to watch when a young Sykes' monkey joined them. It was slightly smaller, but more stocky than the vervets. It was quite hesitant at first, but after about five minutes it fully joined the group.

What struck me immediately was the dramatic difference in their play styles. The vervets were running up the trunk of the tree, climbing onto a drooping branch, sliding down the branch and dropping about 1.5 m to the ground, often clinging together in the process. The young Sykes' monkey employed an entirely different strategy. He ran part-way up the trunk and leaped to the branch, usually knocking off one or two of the vervets in the process (this actually appeared to be the point of the exercise). He even leaped up onto the vervets from the ground when they were near the end of the branch and pulled them off. By this time the vervet group had grown to four medium-sized juveniles, one small juvenile, one nearly-grown sub-adult and one infant who still had a lot of black fur. The Sykes' was nearly the size of the medium-sized juveniles.

On the ground the vervets engaged in prolonged wrestling matches with a lot of rolling about. The Sykes' style was strikingly different with much leaping about and 'hit and run' attacks but very little prolonged contact with the other monkeys. He occasionally ran back to his mother who was feeding nearby (the only adult Sykes' in sight).

By 7:56 h the vervets had moved up the garden towards a small thicket of bushes. At this point the Sykes' monkey was joined by a second, somewhat smaller, Sykes' only just larger than the smallest vervet. Like the first, this Sykes' was initially quite shy, but gained confidence after a short time. The original Sykes' was still interacting more with the vervets than with the other Sykes', but these two did interact as well. Their play was extremely exuberant with many leaps and collisions in mid-air. They would wrestle briefly before separating. They used the trees and bushes for much of their lateral movement; occasionally they ran along the

ground, like vervets usually did. At 8:02 h a third fairly large Sykes', as big as the largest vervet, joined the group. Play continued as before between and within the two groups. The Sykes' appeared to interact with the vervets more than they did with each other. The vervets interacted with each other as well as with the Sykes', but seemed to prefer their own company. The exuberance of the Sykes' actually seemed to bother them somewhat as they would occasionally avoid them.

By 8:10 h the vervets had moved onto the next plot, with denser bush, and they were difficult to see. The Sykes' came and went between the two areas for another two or three minutes before moving out of sight completely.

I have often noticed the difference in agility and gracefulness between the rather more arboreal Sykes' and the vervets who spend much of their time on the ground (or, for that matter, in my kitchen!), but as I had never seen the young ones together, I had not realised how agile and active the young Sykes' were. I suppose I should not have been surprised that their play reflected their life style so well—it is, after all, the training ground for their adult behaviour.

Lorna Depew, P.O. Box 57, Kilifi

HUNTING DOGS ON MOUNT NYIRU

From 27 March to 2 April 1995, a field team from the Plant Conservation and Propagation Unit of the East African Herbarium visited Mount Nyiru (Samburu District, Rift Valley Province), just South of Lake Turkana. The team consisted of B. Bytebier, O. Mwangangi, P. Kirika and T. Waiganjo. Two additional members, Dr R. Bussmann from Bayreuth University and M. Newton from the Kenya Orchid Society, joined our group. We set out to make a check-list of the plants of Mount Nyiru with special emphasis on the Orchidaceae. This area is floristically not well known, probably because it is rather inaccessible.

The classic approach to Nyiru is through Tum, a village on the Western side. From there a track leads to the Northern part of the forest. However, we chose to approach the mountain from the southern side via the village of Ewaso Rongai. From here a 2 km motorable road leads to Eyrie Nyiru, a site where Emma and Yoav Chen are building a small, but exquisite lodge. Eyrie Nyiru lies at an altitude of 1600 m and from here all our equipment was carried up the mountain. We camped on a glade in the forest near the Ewaso Rongai river at 2350 m.

Although the plant life was very abundant and interesting, we all noticed that animal life wasn't all that plentiful. We saw a troop of baboons on the glade and a couple of bushbuck drinking from the river, but that was about it. Nights up there were strangely quiet with only Europe-bound aircraft breaching the silence.

During late afternoon on Thursday 30 March, as we were pressing plants and making field notes, we saw a bushbuck running over the glade just across the river of our camp. The animal was clearly being chased by something. Indeed, a couple of seconds later its attacker, a hunting dog, *Lycaon pictus* (Lemminck) appeared. While the first dog disappeared in the forest in pursuit of the bushbuck, two more dogs crossed the glade, a fourth dog followed them after a minute or so. The subsequent commotion we heard in the forest indicated that the first dog had caught its prey. However, as we were watching these most beautiful creatures, our Samburu guide and cook decided that bushbuck was as good as any other meat for 'nyama choma'. They grabbed their knives and went after the buck and the dogs.

By the time they reached the forest, the dogs had the buck firm to the ground but when the dogs saw the Samburu approaching

they decided they didn't like human beings and ran off. The bushbuck, which wasn't dead yet, saw its chance and got away in the opposite direction leaving the Samburu (and us) to a vegetarian dinner. Later at night, one of us heard the dogs in the forest nearby; perhaps they eventually tracked the wounded buck.

When we told our story to Emma and Yoav, they said that they had also seen four hunting dogs around their camp, a couple of months before. So it seems as if these animals might be semi-resident in that area.

Hunting dogs are no longer common in Kenya and we hope that this sighting might help scientists who are involved in the conservation of these animals. Should any of them need more information, they can contact us at the National Museums of Kenya.

Benny Bytebier, Plant Conservation and Propagation Unit, National Museums of Kenya, Box 40658, Nairobi.

A RECORD-BREAKING EUPHORBIA

Euphorbia meridionalis P.R.O. Bally & S. Carter is a beautiful succulent species with fork-tipped spines and vivid carmine cyathia. In 1982, on Peter Bally's suggestion, it was named *meridionalis*, that is 'southern', "because of its southerly distribution in Kenya and just over the border in Tanzania" (Carter, 1992). In *Flora of Tropical East Africa* Kenya's Central Province (K4 in accordance with the geographical divisions of the Flora) and Tanzania's Northern Province (T2) are indicated as its area of distribution, with the note that it "probably occurs in K6, Masai District [now Kajiado and Narok Districts] around Kajiado" (Carter, 1988). It is described in the Flora as "weakly erect to 1 m, or grazed to ± 25 cm high".

During a recent field trip I found a healthy, widespread population of *Euphorbia meridionalis* in *Acacia*-bushed savannah at about 1600 m altitude amongst grass on 'black cotton soil'—not properly the 'sandy' one indicated in the Flora's note about this euphorbia's habitat. This considerable population is located in Kajiado District, if not exactly 'around Kajiado', that is in the Flora's area designated as K6. Two more populations of the same euphorbia were found, in the same kind of habitat, during random stops 20 and 27 km southwards, at altitudes of approximately 1670 and 1720 m respectively. Both are in K6.

What is more interesting is that in the first locality, growing from the foot of, and supported and protected by, a small strongly armed tree of *Balanites* sp., there was a specimen of *Euphorbia meridionalis* 2.7 m high, in contrast to the maximum of 1 m stated in the Flora's description. The main stem was 5 cm thick at the base, compared with a maximum diameter of 1.5 cm stated in the Flora, the older part being grey and spineless.

This record-breaker plant is surely exceptional, and preserved specimens of it deserve a place in herbaria, as a new distribution record. Voucher specimens have been deposited in the East African Herbarium, Nairobi, and Kew Herbarium, UK (*Foresti 491*).

Acknowledgement

L.E. Newton kindly edited this note and prepared the voucher specimens.

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Arturo Foresti, P.O. Box 30181, Nairobi.

Book Reviews

Kenya Ceropegia Scrapbook. Notes and Records of some Kenya Ceropegia by P.G. Archer. ISBN 0 646 12174 X. Pp. 183. Numerous (unnumbered) line drawings and colour plates. Artemis, Hobart (Tasmania, Australia), n.d. [1992]. KSh. 1,000 from EANHS Office.

This book was published a few years ago in Tasmania, but it has only now become readily available in Kenya. It is undated, but a copy sent to me by the author soon after publication is inscribed "25 xii 1992". The author, Philip Archer, lived in Langata for 24 years, during which time he developed a great interest in succulent plants. He travelled widely and collected many plants, including several undescribed species. They include those later published as *Aloe archeri*, *Echidnopsis archeri* and *Huernia archeri*. It seems strange that "*Ceropegia archeri*" got no further than an unpublished manuscript name, since Archer developed an unsurpassed skill in finding *Ceropegia* plants in the field. He started by finding one species on his own property in Langata, and eventually he had found no less than nine species within half a mile of his house.

As the title suggests, this book is an informal account of the many ceropegias found by Archer in Kenya. After a general introduction to the characters of the genus, the various plants are presented in some detail. Nearly 400 specimens are cited in the book, and they are sorted into 31 taxa. For each taxon there is a description, some line drawings, and colour plates. As though to emphasise the informal nature of the book, the author exercises great caution by not giving definite scientific names for the plants. Many are given nicknames, such as "Mwatate tuber" and "Top-Knot". Finally the author lists locality data for his collections, and provides maps of those localities.

As a first impression, the lack of formal treatment, with no names for many plants and no identification key, will be disappointing to anyone buying this book in order to name their ceropegias. However, the taxa are arranged into groups on the basis of the root system (tuber, fusiform roots, etc.) and growth habit, and the numerous illustrations make it fairly easy to match a plant with one of Archer's taxa. Also, although the author states in the Preface that specific names are not given, scientific names are given for many of them in the Comment section, in the form "Known by: Crassifolia" (for *Ceropegia crassifolia*). Therefore it is possible to identify many of the more common species using this book if you can recognise a specific epithet when you see one (a list of Kenyan ceropegias will be found in *Ballya* 1: 79–81, 1994). Clearly the book will be more useful when someone can produce a list of definite names for all of the 31 taxa. Two manuscript lists of names are in circulation at present, one by Colin Walker, one by Patrick Masinde. However, it will be some time before a final list can be produced, not least because some of Archer's plants represent undescribed species.

Apart from its possible use in identifying plants, the book is a fascinating account of the astonishing diversity of ceropegias in Kenya. The variation encountered in many species is also remarkable, making a taxonomic study no easy task. The lists and maps of collection localities are an invaluable guide for anyone wishing to know where to start looking for ceropegias. It is to be hoped that the appearance of this book will act as a stimulus in two ways. Firstly, highlighting the genus could lead to more collections being made in the field (and don't forget to send specimens to the East African Herbarium for study). Secondly, the example set by Archer should encourage anyone

collecting plants to keep good records of localities and observations.

L.E. Newton, P.O. Box 43844, Nairobi

Flora of Tropical East Africa

The Flora of Tropical East Africa (FTEA) was started at the Royal Botanic Gardens, Kew, in 1949 as part of this institution's tradition of flora-writing that extends back to the 1860s. Initially allocated a frame of 50 years, work on FTEA has proceeded apace with contributions by over 100 specialists, most of whom were based at Kew, others drawn from 26 institutions in 12 countries. Sixty-five percent of FTEA has already been published, and work-in-progress will bring this total to 88% by 1998.

A Flora provides a catalogue of the plants known to occur in a given region. Each volume provides a description of the family, a diagnostic key to the genera, a description of each genus, and additional keys that are used to determine the species name of a given plant. For each species, information is provided regarding previously published references to the species, a detailed description of the species, a citation of representative specimens for the countries where it grows, a concise statement of distribution and habitat, and a list of alternative, but invalid, names (synonyms) that may have been published. Botanical illustrations are also provided for selected species, which are of use to the botanist and layman alike to interpret the technical descriptions.

Flora of Tropical East Africa: Lythraceae by B. Verdcourt. ISBN 90 6191 366 7. Pp 62. 16 text figures. A.A. Balkema, Rotterdam, The Netherlands, 30 November 1994. Price UK£ 11.20

The family Lythraceae in this region consists of annual or perennial herbs, shrubs or trees. Eight genera occur naturally in the Flora area and a number are also cultivated as ornamentals, one occurring as an escapee. The family includes henna tree (mhina in Kiswahili), *Lawsonia inermis* L., a shrub or small tree used extensively for its dye and medicinal properties. The red dye made from the leaves is used for dying nails, hands, feet and even donkeys by the Coastal, Somali, and other communities in the region.

The structure and layout of the text is consistent with previous volumes of FTEA. The family is introduced generally, followed by a brief description of cultivated species and allied genera before the main text.

Keys to the genera and species work well, though flowering and fruiting material is required, and a high power microscope is needed to see some of the characters. The illustrations show the various characters well, and are useful in picking minute differences especially in flowers. Nine new names are validated in this fascicle.

This FTEA account clearly demonstrates the author's knowledge and expertise with flora, especially in East Africa, where he has worked extensively. Input by Mr P.S. Masinde of the Herbarium, National Museums of Kenya, has given the product a final polish, with exhaustive coverage of represented material.

Flora of Tropical East Africa: Celastraceae by N.K.B. Robson, N. Halle, B. Mathew & R. Blakelock. ISBN 90 6191 365 9. Pp 78. 19 text figures. A.A. Balkema, Rotterdam, The .Netherlands. 30 November 1994. Price UK£ 13.00

The family Celastraceae includes *Catha edulis*, the source of the popular Miraa masticatory stimulant. *Maytenus buchananii* is poisonous to livestock and people while the fruit of *Salacia madagascariensis* is edible. Many *Maytenus* species yield a tough durable wood commonly used to make handles for tools. This account has 17 genera

and 57 species, 8 with subspecies or varieties.

The keys we have tried work out well, though flowering material is essential for most genera. Reference to colours of disk and/or aril in the keys presents a problem as most collectors do not record these. The illustrations are superb and a useful supplement to the keys.

This FTEA part was prepared at Kew with the editorial advice of P.S. Masinde of the National Museums of Kenya which is illustrated by the publication of a new species, *Maytenus conferta* Masinde, a coastal taxon separated from *M. heterophylla* (Eckl. & Zeyh.) N. Robson.

Four new names are validated in this fascicle: *Apodostigma pallens* (Oliv.) Wilczek var. *dummeri* N. Halle & B. Mathew, *Maytenus conferta* Masinde, *Pristimeria andongensis* (Oliv.) N. Halle var. *volkensii* (Loes.) N. Halle & B. Mathew, *Reissantia indica* (Willd.) N. Halle var. *orientalis* N. Halle & B. Mathew.

Abraham M. Muasya and Geoffrey Mwachala, East African Herbarium, NMK, P.O. Box 45166, Nairobi

Society News

85th ANNUAL GENERAL MEETING

The 85th annual general meeting of the Society was held on Monday 12 June, in the Seminar Room of the National Museums of Kenya. Agenda items were approval of the minutes of the 84th AGM, matters arising from these minutes, Chairman's address, address by the Ugandan representative, presentation of audited accounts for 1993 and 1994, new subscription rates, and election of the executive committee and of several subcommittees.

The addresses by the Chairman (Dr Leon Bennun), and by the Ugandan representative (Mr Achilles Byaruhanga, programme officer) are reproduced below. Audited accounts were presented by Dr Clive Lovatt. A summary of this report will be included in a future issue of the *Bulletin*. Suffice it to note here that the rise in subscription rates was necessitated by the continuing rise in expenditure. The Society's subscription rates no longer bore any relation to the real cost of servicing memberships.

Members of the newly-elected executive committee and subcommittees are listed on the back cover. New subscription rates can be found on the inside back cover.

After the meeting, Simon Thomsett presented an interesting and stimulating talk about his work with African raptors.

EANHS Chairman's report, 1994/95

Ladies and gentlemen,

It is a great pleasure to welcome you all to the Society's 85th Annual General Meeting.

The Society has once again had a busy and active twelve months. Indeed, our activities continue to expand at a rate that this speech cannot possibly keep pace with—at least if we are to conduct all the other business on the Agenda this evening! Today I will only give the sketchiest outline of developments among our specialised sub-committees; all of them have their own newsletters or journals to keep members up to date with progress. Similarly, I shall leave Achilles Byaruhanga, Programme Officer at our Uganda branch, to report on developments in Uganda.

Within the Society's office, we have seen major improvements in both structure and function. The renovation of the main office and rear rooms has been completed, telephone lines are in place, and the office is

now a much easier place to work in and communicate from.

During the last year, we said goodbye to Ms Jennifer Oduori, Office Manager since July 1993. Jennifer contributed a great deal to the Society and I would like to record my thanks for her dedication. In September 1994 Ms Wamuyu Gatheru joined us as Projects Co-ordinator, a part-time post shared with the Tropical Biology Association. Unfortunately Wamuyu felt the tug of her continuing conservation commitments too strongly, and left us at the end of January this year to pursue these outside interests. We wish her well. Society staffing has now stabilised. Rowena Costa-Correa joined us as honorary Office Manager in November 1994, and through an enormous amount of hard work has, I hope all would agree, greatly improved the Society's general administration and its public face. Gloria Fernandes, although primarily involved in the wetlands inventory project, has turned her hand to many other tasks in support of Rowena's work. Finally, Vincent Owuor, who is employed by the Tropical Biology Association, has been of invaluable assistance to the Society's office work over the past nine months; I would like to thank both him and the TBA for their help.

Along with these changes we have made slight alterations to the office hours. The office is now open five days a week, from 9:30 am to 4 pm every day, including lunchtime (except Wednesday, when it is open from 2–5 pm). We made these adjustments based on when members actually visited the office, and hope that the new hours will suit most people better. If not, we would like to hear from you!

Our sub-committees and projects continued a very active and varied programme. The Ornithological Sub-committee continued to produce *Scopus,* run the ringing scheme (including fieldwork at Ngulia), and work on the difficult issues involved in producing a new East African list. The Kenya Wetlands Working Group continued its wetland inventory and monitoring work, as well as tracking issues in wetland conservation and management. In August 1994 the Society signed Declarations of Intent to become the BirdLife partner in both Kenya and Uganda. The work of bird conservation in Kenya is delegated to BirdLife Kenya, which continued to produce *Kenya Birds*, plan for the implementation of the Important Bird Areas project (which has now begun, with support from the Royal Society for the Protection of Birds) and to support conservation and education activities. The latest of these, Bird Day '95, took place just two days ago at the NMK and attracted a wide cross-section of the public.

Succulenta EA continued to produce *Ballya* and held a series of very successful and well-supported outings. Our project, Friends of the Nairobi Arboretum, continued its sterling work with many excellent events and activities connected with the arboretum; to my mind one of their signal successes over the past year has been to initiate the setting-up of an Arboretum Board of Management. This body will take decisions on the way that the Arboretum is run, with FONA in support to help implement these and raise the necessary funds.

For the first time at this AGM, the committees of BirdLife Kenya and the Kenya Wetlands Working Group will be elected by the EANHS membership. This is a welcome move towards developing a more unitary, integrated and accountable Society, and I am delighted that the two sub-committees have decided to take this step.

In September 1994 the Society formally took over the Kipepeo Project at the Kenya coast. As many of you will know, this innovative project, which is supported by the UNDP GEF small grants initiative, aims to improve the lives of people dwelling around the Arabuko-Sokoke forest through village-based butterfly rearing. This provides a way in which people can benefit economically

from an intact forest and thus a strong incentive to conserve it. The project is making excellent progress towards its goals and we hope can provide a model for similar initiatives elsewhere. The forest itself has been much in the news of late, and the Society has been closely involved in advocacy to prevent an important part of it being de-gazetted.

The highlight of the publications calendar this past year was the second edition of *Upland Kenya Wild Flowers*, by Dr A.D.Q. and Dr Shirley Agnew. The book was officially launched on 8 May in a well-attended ceremony. With the near-simultaneous production of *Kenya Trees, Shrubs and Lianas* by our daughter organisation, the National Museums of Kenya, it has been a bumper year for Kenyan botanists. I am also very happy to report that the first issue of the *Journal of East African Natural History* has finally gone to press—we all hope that it will blossom into a truly indispensable forum for biodiversity research in the region.

Despite the continued lack of a Functions Organiser, we had a full year of lectures and films; and thanks to the energy and enthusiasm of Major Kaigwa, our programme of outings has largely been back on track. We hope for a still more active year in 1995/96.

As always, our Society this past year has run on the time, energy and commitment of dozens of members. I would like to thank all members of the Executive Committee and the various sub-committees, the organisers of our project work, our honorary office staff and the many others who have made varied contributions. It is thanks to you all that we can continue to work together towards a better understanding of East African nature and of how to conserve it for the enjoyment of our members in another 86 years from now.

Thank you.

Address by the Programme Officer EANHS(U), Mr. Achilles Byaruhanga

Mr Chairman, dear members of the society, Ladies and Gentlemen

Let me begin with conveying my greeting from the Society members in Uganda who wish that the relationship between the Uganda branch and the main society in Kenya be upheld. Since the EANHS(U) was established, this is the first time an official from the branch has attended an AGM in Nairobi. It is a pleasure, therefore, that we were invited and I have been able to come and represent the branch at this AGM.

As some of you are aware, the EANHS has been in existence for now over 80 years, but for many decades it has been active mainly in Kenya. For a long time, Uganda was plunged into political confusion and civil strife that created an environment that rendered the Society dormant. It is only the last few years that the branch in Uganda was rejuvenated. Our activities are governed by the Society constitution although there is a set of regulations that specifically apply to the Uganda branch.

I am glad to report that the branch in Uganda is now registered as a Non-Governmental Organisation to carry out its activities in the fields of advancing natural history study and conservation of natural environment in the country. This was after consultation with the main Society here in Nairobi who gave us a go-ahead if that meant giving the branch more autonomy in carrying out its activities. The branch has now a fully functional office with a few facilities. A full-time programme officer has also been employed and now co-ordinates the activities of the society. All this has been possible with the support from the Royal Society for the Preservation of Birds (RSPB), the BirdLife partner in UK that funded the establishment of the BirdLife International partner in Uganda.

The Society can be vibrant if it has a big and enthusiastic membership. It is gratifying to see that our membership has slowly but steadily risen to 88 from 30 at the end of last year. Our financial base is still relatively shaky because membership subscriptions alone do not amount to much. We are aiming at doubling this figure in the coming year. In this connection, I would like, on behalf of the members in Uganda, to extend my gratitude to the Society headquarters here for having continued to send the quarterly *Bulletin* to the members in Uganda despite that fact that all our subscriptions remain at the branch. It shows that you recognise our problems and are willing to support us until such a time as we are capable of contributing to the production of the *Bulletin*.

While on the issue of the Society's publications, it is notable that Uganda articles are conspicuous in their absence from the *Bulletin*. During our annual meeting, the Chairman suggested to the incoming committee to set up a small editorial group to receive and recommend articles to both the *Bulletin* and the *Journal of East African Natural History*. This probably would give confidence to the potential authors that their contribution is worthwhile. Through this we hope members will be interested to write articles for both publications.

The EANHS(U) has two active sub-committees: the Uganda Wetlands Working Group (UWWG) and BirdLife Uganda (BLU). The UWWG works towards sustainability and wise use of the wetlands in the country. It organises the biannual waterfowl counts in January and July at ten sites in eastern, central and western Uganda. In collaboration with the Uganda National Wetlands Conservation and Management Programme and IWRB, the UWWG conducted a course for trainees on waterfowl identification and counting techniques in January 1995 at Mweya in Queen Elisabeth National Park. One of the outcomes of this course will be a waterfowl training manual which is now in preparation. There are plans for a follow-up training course in July this year, as well as analysing the waterfowl count data collected since the programme started for publication.

BirdLife Uganda has been setting the stage for launching the Important Bird Areas programme. A document detailing the activities under this programme has been prepared and fieldwork is due to begin soon. The sub-committee also undertook to produce a Popular Bird Book for younger amateur naturalists. A draft of this book has already been made and is now being reviewed by various people. We hope that when produced, it will arouse interest in conservation in the younger generation.

During this year's annual general meeting, members accepted and adopted the Plants Working Group as the third Sub-committee of the EANHS(U). This group was received enthusiastically by members and we hope it will dispel the misconception that the society is biased towards birds.

As the Uganda branch grows stronger it will be necessary to streamline our relationship with the main EANHS office here in Nairobi. That's why the members in Uganda accepted to be represented at this year's AGM so that we put our ideas together and work towards the same goal. The EANHS Chairman, Dr Leon Bennun, has also made several visits to Uganda. It is during such visits and meetings that ideas about the relationship between the branch and Nairobi will begin to emerge. It is not surprising, therefore, to find that some members of the Society in Kenya are not aware of the existence of Uganda branch.

I wish to thank you once again for inviting us to this AGM. This mutual relationship will give members in our sister countries a stronger sense of brotherhood and belonging in their activities.

Thank you very much.

APPRECIATION: JOHN RICHARDSON

Early in March, Dr John Richardson left us. He was known to many, including the Ornithology Department of the National Museums of Kenya, as one of Kenya's best and most dedicated veterinarians. His specialisation—wildlife—took him all over this country; over the years he and his wife Pat provided care and hospitality to large numbers of birds, antelopes and other creatures.

One of John's fields of interest was the relationship between wildlife and local communities. The population of Elangata Wuas Ecosystem Management Programme in Kajiado for example remembers him particularly for the fact that, whenever they reported a sick eland or ostrich, the doctor arrived from Nairobi within a few hours.

John's many friends knew him as an extremely laid-back person, who saw the humour in almost every situation. But it appears that we all were deceived. John was never one to burden others with his problems, and few, if any, people can have known the inner struggles he evidently faced. After many attempts to find employment in his field of specialisation he went, in 1994, head on into a job at a large private ranch where, as he phrased it, his presence was mainly cosmetic. This undoubtedly contributed to his final and tragic breakdown.

John was irreplaceable; he will be keenly missed.

Matthijs de Vreede, Elangata Wuas Ecosystem Management Programme, P.O. Box 40658, Nairobi.

OBITUARY: JAN GILLETT

Jan Gillett was an outstanding personality in tropical African botany for over 60 years; he was a man of knowledge, curiosity, charm and unfailing kindness.

Born into a Quaker banking and shoe-manufacturing background in Oxford, UK in 1911, he was educated at the Dragon School, Oxford, and Leighton Park School, Reading. He won a scholarship to King's College, Cambridge in 1929 and took First Class Honours in both parts of the Natural Sciences Tripos. In 1928–29 he spent some time in southern Africa on expeditions with John Hutchinson, a distinguished Kew botanist; the botanical results were substantial and fully described in Hutchinson's 'A Botanist in Southern Africa' (1946). In 1932 he joined the British Somaliland/Ethiopia Boundary Commission, making a fine collection of plants and an astute survey of the vegetation, published in the 'Kew Bulletin' in 1941. After obtaining a Diploma in Education at London University he taught in UK until he joined the Army in 1941. He married Gertrude (Bert) Spektor in 1937, and they had three sons and a daughter. He had a distinguished war record, serving in the Far East, and was mentioned in despatches and recommended for the MC.

In 1946 he was appointed botanist to the Iraq Department of Agriculture, and made extensive collections in remote parts of that country which later proved of great value for the work done at Kew on the 'Flora of Iraq'. In 1949 he returned to England and became a Principal Scientific Officer at the Royal Botanic Gardens, Kew, working on the newly instigated 'Flora of Tropical East Africa'.

He undertook revisionary work for a large part of the legumes, laying the foundation of a new classification for the subfamily of peaflowers, now universally accepted. His theoretical concepts, notably the effects of pest pressure as a factor in natural selection, were wide ranging and well ahead of his time. In 1953 he made a major expedition to little-known areas of the Kenya/Ethiopian border on a further Boundary Commission. In 1963, at the invitation of King Hussein, he accompanied an ecological survey mission of Jordan led by the ornithologist Guy Mountfort and

including Sir Julian Huxley, Max Nicholson and Eric Hosking. The mission's achievements were racily described in Mountfort's 'Portrait of a Desert' (Collins 1965).

In 1963 Jan Gillett arrived in Nairobi, where he was to follow his deep interest in African botany for the next 20 years. He was appointed Botanist in Charge of the East African Herbarium, taking over from Bernard Verdcourt, who returned to Kew and he held the post until 1971. Thereafter, and until his departure to UK in 1984, he was adviser of his successor, the Ugandan botanist, and Assistant since 1963, Christine Kabuye. He provided a major impetus to the Herbarium, seeing its transfer from the East African High Commission to the National Museums of Kenya, maintaining the high standards of the largest herbarium in tropical Africa, training a new generation of African botanists and keeping up a wide correspondence with professional and amateur botanists in East Africa and elsewhere. He always welcomed genuine visitors to the Herbarium and took infinite pains to answer their queries and to encourage high standards in plant collecting. Many botanists and plant enthusiasts will recall with pleasure the lively and stimulating discussions led by Jan at coffee or tea time in the Herbarium library in the true Kew tradition.

After 1971, freed of administrative duties, and with support from ODA for some years, he spent more time in the field, taking up an interest in commiphoras (the source of myrrh) in Kenya and making surveys in Somalia. He made many contributions in a self-effacing way to the compilation of books on local plants, including helping his friend, the distinguished Sir Michael Blundell, with several editions of his 'Guide to the Wild Flowers of East Africa'. He also took endless pains in checking typescripts of each part of the 'Flora of Tropical East Africa' before publication by Kew. He was revered for his botanical experience, scientific learning and personal kindness, but as his health failed he was, in 1984, persuaded with great regret by his loving family and medical advisers to return to England.

With the change of altitude his health improved, and he was at once, somewhat to his family's concern, a daily visitor to Kew, as his home was within walking distance of the Gardens, becoming a much loved father figure of African botany in the Herbarium. He became once more a regular attender of the Friends Meeting in Isleworth, and became an elder. In 1989 he was given a new lease of life with a heart by-pass operation, and this enabled him to complete his landmark account of the commiphoras for the 'Flora of Tropical East Africa' in 1991, and to continue with his studies of arid-land plants for the new 'Flora of Somalia'. In his last years he turned more to ideas about the role of diet, fire, speech and religion to the origins and spread of human culture and customs. His astuteness, curiosity, unfailing source of tales, extraordinary breadth of political, social and scientific reading left him unrivalled in any argument he liked to raise, even as he struggled with problems of a failing memory. His faith as a Quaker, his love of life and his social concern enriched all who knew him, and even in his last days at home he rallied to talk to his botanical friends with all his old enthusiasm. He will be long remembered by his friends in East Africa, many of whom visited him at Kew, and we send our sympathy to his beloved wife and family.

Jan Bevington Gillett, botanist, born May 1911; married 1937 Gertrude (Bert) Spektor (three sons and a daughter); died Kew 17 March 1995

Roger Polhill & Ann Robertson

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This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society-National Museum Library (postal borrowing is possible) and a copy of the *EANHS Bulletin* every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

JOURNAL

The Society publishes, in collaboration with the National Museums of Kenya, the *Journal of East African Natural History*. The *Journal* is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Editor, Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

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This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), Box 44486, Nairobi, Kenya.

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The Ornithological Sub-committee publishes this journal three times a year, cost KSh. 600 per annum. All correspondence to D.A. Turner, Box 48019, Nairobi, Kenya.

BALLYA

This bulletin is published three times a year by Succulenta EA, a division of the EANHS. Members of the EANHS can join Succulenta EA, at a cost of KShs 400 per annum, and receive *Ballya*. Contributions for *Ballya* can be sent to Edward Vanden Berghe, Box 44486, Nairobi, Kenya.

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Articles and Notes

SNAKES ON THE USANGU PLAINS: AN INTRODUCTION TO SANGU ETHNOHERPETOLOGY

This paper is based on notes I made while conducting anthropological fieldwork in the Usangu Plains of south-west Tanzania in 1980-82. I did not make a systematic study of Sangu ethnoherpetology and was ill-equipped at that time to identify the snakes which I saw and those which were described to me (the same applies to other reptiles, which are not discussed further here). However, while recently re-reading through my field notes and manuscript dictionary of *ishisango*, the Sangu language, I found that there was sufficient information to identify some of the named varieties which I was told about. I have therefore decided to publish this information, together with some additional observations and comments, in the hope that it will provide a useful starting point for future researchers.

The Usangu Plains

The Usangu Plains lie in the eastern Rift Valley just south of the Ruaha Game Reserve, at an average elevation of 1,000 metres above sea-level. They take the form of a shallow alluvial basin, covering an estimated total area of 15,560 km². To the south and west they are hemmed in by the Southern Highlands and the mountain ranges which rise up from the northern shores of Lake Malawi. The streams and rivers which flow down from these mountains join in Usangu to form the Great Ruaha River which meanders out of the Plains to the north-east. There is one wet season, from December to April. This is invariably accompanied by substantial flooding, and the floodwaters often remain until the dry season is well underway. For half of the year, however, from June onwards, most of Usangu takes on a semi-arid aspect.

The vegetation of Usangu has been described in outline by Procter (1968) and his classification supported by Charnley (1994), who also provides a detailed description and analysis of recent patterns of ecological change on the Usangu Plains. According to Procter, the Plains host eleven major habitats with specific vegetation associations, ranging from rivers and permanent wetlands, through seasonally inundated flood-plains and grass-lands, to thickets, thorn-bush and woodlands dominated by different tree species. The history of the human population in Usangu and patterns of land use in the Plains have been described by me (1984) and, with particular emphasis upon immigrant groups and pastoral resources, by Charnley (1994).

Snakes on the Usangu Plains

As far as I am aware, no survey of Usangu's herpetological fauna, and of snakes in particular, has ever been undertaken, though I assume that some collections have been made there. Given the wide range of habitats available in Usangu and our general knowledge of snakes and their distribution in this region, it can be assumed that the plains support a wide variety of snake species.

Snakes are certainly everywhere in evidence, as a number of travellers to Usangu have been quick to notice. Marius Fortie, an adventurer who crossed Usangu in September 1934, begins his account of this journey by describing how he shot a five-foot Puff Adder in two. This unfortunate serpent had made the mistake of visiting Fortie while he was in the middle of taking a bath in a

room in the derelict compound of Brandt Mission. Later he was able to brush this incident aside. "On entering Usango I saw the trails so criss-crossed with the tracks of cobras and vipers which thrive in those hot sandy plains, that when the Puff Adder interrupted my bath at Brandt I was not much startled" (1938, p. 279). Further on in his account he provides us with a more comforting perspective: "Although snakes are numerous, casualties from snake bites are rare because the Puff Adder, the most common venomous reptile, is so sluggish that it seldom strikes unless actually stepped upon" (1938, p. 293).

My own experience in Usangu was similar, though I did not see any puff-adders, which are well camouflaged and whose numbers have probably been considerably reduced since the 1930s in the increasingly populous areas of the southern Plains where people are apt to kill any that they come across. However, when walking the three-hour journey between Igurusi and Utengule, I invariably saw at least one snake crossing the dirt track. On forays into the bush around Utengule and Luhanga I always found it wise to let one of the villagers lead the way, given their greater skill in spotting snakes on or by the path. In Utengule itself, where I lived, I was taught to give a wide berth to any long and thin object I might see on the path at night, and got so used to doing this that many months after returning to England I would sometimes surprise friends by pulling up with a start in front of twigs on the pavement.

On one occasion, now humorous to relate, I had to flee from a latrine when a large dark snake appeared through a crack in the earthen wall. Another incident occurred in a friend's house. Some time earlier a large snake had been killed in the house while in the process of raiding a nest of hen's eggs. My friend declared that sooner or later the snake's spouse would also appear. Sure enough, one night as we were eating dinner, a large snake slithered under the front door, scattering all of those present, including the mother of the household who was sitting on the cement floor with her children. This snake also headed for the hen's nest, but was dispatched by my friend and another guest with a couple of long sticks.

I recorded a few instances of snake bite, but none in which death had resulted. One interesting case of serious snake bite occurred following the appearance of a Sukuma (on other accounts Fipa) snake-charmer in Utengule on 29 March 1981. He drew a large crowd at one of the drinking clubs in the village when he stood in the middle of the open ground and let two sizeable snakes (described in my notes as 'cobras') crawl and intertwine over his body. He was subsequently reported to be selling medicine to guard against snake bite on the basis of this performance. Unfortunately, this medicine cannot have been very effective, because shortly afterwards he was bitten by one of his own snakes and had to be rushed to hospital in Mbeya where, it was said, the affected limb was amputated. Sangu observers ascribed his misfortune to witchcraft rather than to the ineffectiveness of his medicine. I assumed that he had failed to milk the snake of all of its venom.

I noted more instances of snakes being killed. Although snakes are still a common sight in Usangu it is likely, as suggested above in the case of Puff Adders, that their populations are declining in inverse proportions to the increase in human population and land use.

Sangu Ethnoherpetology

The Sangu (*avasango*), the indigenous inhabitants of the plains, recognise a number of different kinds of snake (*inyoxa*). We should not expect to find a one-to-one correspondence in every case between their names for these and their scientific designations. This is a common feature of

folk taxonomies, including the historical and everyday classificatory schemes of English (*e.g.* Berlin, 1992). It is also a feature of other components of Sangu ethnozoology. In some cases one Sangu term covers more than one zoological species and may even refer to species belonging to different genera. In other cases the Sangu give different names to subspecies or colour phases and variants of the same species, including animals of different age and sex (where sexual dimorphism is particularly marked). At the same time it must be said that many Sangu names do correspond to single zoological species, especially in the case of large, common and/or better-known animals. Small and less familiar species are more frequently grouped together. This no doubt also applies to Sangu classification and naming of snakes, as the following examination of indigenous taxonomy suggests.

All of the Sangu names for snakes which I recorded are presented below, together with notes on their identification and other relevant observations. Unless otherwise stated the zoological observations are taken from Easterbrook (n.d.), Hedges (1983), MacKay & MacKay (1985), and Branch (1988). The numbers in brackets, following the vernacular names, refer to the noun class in Sangu.

inyatu (9/10), ilipingang'ombe (5/6). Both of these names appear to refer to the African Rock Python, *Python sebae*. *inyatu* is cognate with the term for python in many other Eastern Bantu languages, including Swahili *chatu*. It was described to me as non-poisonous and I was told that it can sometimes be found in water. Although African Rock Pythons can inflict painful wounds with their teeth, they usually kill their victims by coiling around and asphyxiating them, before attempting to swallow them whole. They rarely attack humans. They are, however, good swimmers, and are known to prey upon crocodiles, fish and other aquatic creatures. *ilipingang'ombe* was also given as a name for pythons and likewise was said to be sometimes found in water. This is a compound term which literally means 'the one which stops cattle' in Sangu, indicating that they are also known to attack livestock. Its designation in noun class 5/6 implies an animal which is large, bad, or both of these, and it may be that *ilipingang'ombe* is reserved for the large specimens and *inyatu* for smaller African Rock Pythons.

ilipingang'ombe is also the Sangu name for a rainbow. I was unable to elicit an explanation for this in the field, but it is presumably connected with the Nyakyusa belief that pythons (or at least one mythical variety of them) cause rainbows when they look up to the sky. The same beast is also believed to live near rivers, and some Nyakyusa therefore run away from rivers when they see rainbows (Walsh, in prep.). The Nyakyusa are near neighbours to Sangu and many of them are recent immigrants to the Plains. The explicit reference of the Sangu name, however, suggests that this is or was also their own belief, though it may have been inherited or borrowed in the past (it may even have been borrowed by the Nyakyusa from the Sangu).

imalulu (9/10). I would probably not have recorded this name if it had not been for the fact that I killed one in Utengule on 11/5/81. I noticed it on the floor of my house at night just as I was preparing to go to bed. It lay curled up in front of the only door to the house, blocking my way out. Lacking a stick or other suitable implement, I chopped it in two with a machete.

Local opinion held that it had probably come into the village to escape the seasonal drying up of the surrounding plains and into my house to escape the increasing cold. My cursory notes indicate that it had a purple and black back and white belly. It was fairly long but only the thickness of a thumb. It

was later told that it was very poisonous. However, I would now tentatively identify it as a Purple-glossed Snake, *Amblyodipsas* sp., and therefore relatively harmless.

injoxa nyalulemba (9/10). This name means 'green snake' and is probably a generic term for the Green Bush Snakes, *Philothamnus* spp. It was described as a green snake of pencil-thickness which is not very poisonous and usually flees from people. I saw one on 28/6/81 climbing a tree near a house at the edge of Utengule. It was very thin and very bright green in colour. These descriptions fit the Green or Bush Snake very well. Different species are quite difficult to distinguish and the only certain way is by scale counts. It would therefore not be very surprising if the Sangu, like other East African peoples, grouped them under the same name.

injoxa nyaluhanjala (9/10). This name means 'firewood snake', referring to the resemblance between the snake when motionless and a relatively thick and long branch of firewood. The only other information which I recorded on this snake is that it is very poisonous and capable of 'standing up'. This last observation implies a cobra of some description, following their habit of lifting the forebody and spreading a hood when threatened. I would tentatively identify this with the Egyptian Cobra, *Naja haje*, which is the right shape and size and has a variable coloration which might be taken to resemble firewood in different stages of drying and possibly with lichens on the bark.

The Egyptian Cobra is also reported to sham death and this could account for the motionlessness which increases its resemblance to firewood.

imfwila (9/10), ilifwila (5/6), ilipingankwale (5/6). The description of the snake which goes by one or other of these three names (they are equated by the Sangu themselves) leaves little doubt that their usual referent is the Black-necked Spitting Cobra, *Naja nigricollis*. *imfwila* has cognates in other Eastern Bantu languages, including Swahili (*fira*, also *swila*), and in which it usually describes the same and or closely related species. I was told that it is a black snake which spits venom into the eyes and also bites, though its attacks are not lethal because local medicine is available to counteract the poison (sufficient doses of which are lethal to humans according to the literature). *ilifwila* is the augmentative and emphatic form of the same name, and may be used to refer to larger specimens. *ilipingankwale* means 'the one which stops the francolin' and suggests that these birds, *Francolinus* spp, are among its items of prey. (Procter, 1968, records the presence of three species of francolin in Usangu: the Red-necked Spurfowl, the Coqui Francolin, and Hildebrandt's Francolin). I was told that it is large, has a red throat, and sometimes climbs trees. These are all characteristics of the Black-necked Spitting Cobra, which in East Africa usually has a patch of salmon pink (sometimes deep red) scales below the neck, which are clearly visible when it rears up to spit. It is possible that *ilipingankwale* usually refers to larger specimens which have this patch of colour. Otherwise one of my informants specifically identified *ilipingankwale* with *ilifwila*. The one-time Southern Highlands Provincial Commissioner, J.E.S. Griffiths, recorded seeing a large spitting cobra on the road to Rujewa (diary entry of 20/8/58), and I saw at least one Black-necked Spitting Cobra, though of normal dimensions, while living in Usangu.

ilipili (5/6), imili (9/10). This is the Puff Adder, *Bitis arietans*. The usual form of the Sangu name is *ilipili*, which also has cognates in many closely related Bantu languages, including the Swahili *pili* or *piri*. It was described to me succinctly as short,

fat and very poisonous, and not surprisingly is therefore put in the augmentative noun class. *imili* is a form of the same name in class 9/10, which is the usual class designation for snakes. I only heard this term used once in Utengule. This was when a man was reported to be in some pain after having been bitten by a snake while working in his rice plot (this was in the second week of November, 1981). I listened to an argument about the kind of snake which had bitten him: according to one side it was an 'ilipilu' (presumably misheard for *ilipili*), and according to the other it was *imili*. This suggests that *ilipili* and *imili* are considered to be different kinds of snakes, though I have no more information on this point.

imoma (9/10), imuhando (9/10, or possibly umuhando, 3/4). The first of these terms has cognates in other Eastern Bantu languages, including Swahili (*moma*), which refer to the Gaboon Viper, *Bitis gabonica*, and related species. *imoma* was described to me as being similar to *ilipili*, the Puff Adder (*B. arietans*), being more or less the same colour, but longer and more dangerous. This could conceivably apply to the Gaboon Viper, although its colouring and pattern are quite distinct to close observers. In East Africa it is usually found in forests or on forest margins, and while Usangu lacks this kind of habitat, it is possible that isolated specimens make their way down the Plains from the forested escarpments in the south and west. An identification with the Gaboon Viper would also suit the description of *imuhando*, which I was told was the most poisonous snake in Usangu, causing instant death to unlucky victims. Fortunately for snake-haters it is said to be very rare. I was also told that it can make a sound like a cock crowing. It was not linked to *imoma* by anyone I spoke to, though I did not ask if it was. *imuhando* could also conceivably describe the Gaboon Viper, which is capable of producing a loud and deep hissing noise when disturbed. However, on one occasion I also recorded the compound name *imfwila muhando*, suggesting a relationship, real or perceived, with the Black-necked Spitting Cobra. Further research is therefore required to establish the precise reference of these terms (*imoma, imuhando*) and whether or not Gaboon Vipers occur in Usangu as I have suggested they may.

I did not record any other Sangu names for snakes, except for the mythical serpents *umutila* and *inyamfwila*, which I discuss elsewhere (Walsh, in prep.). Almost all of the terms I did record refer to common and/or notably poisonous species. This may have been a function of my failure to probe more deeply, or alternatively may reflect the fact that most Sangu only know the names of the species which they are most likely to meet and those which they feel are likely to pose a threat to their lives. A Kukwe (Nyakyusa) woman told me that there are only four kinds of snake (*i.e.* four named varieties that she knew of) in Unyakyusa, in the hills and plains to the south of Mount Rungwe, south-east of Usangu. If, however, a much longer Sangu list exists, then it should not be too difficult to elicit it. The more difficult task will be to establish the zoological referents of Sangu names.

Conclusion

There are other dimensions of Sangu ethnoherpetology which I have not described above. Among these are indigenous treatments for snake bite. One treatment I was told about used the roots of a short grass called *ilidilimbuli* (said to be known as *nsindu* in Nyakyusa). These are chewed and rubbed onto the bite, and can also be carried around as a protective charm against snake bite. Some people drink their own urine as a cure for snake bite. Others extolled the virtues of the 'Black Stone', which is applied to the site of (bleeding) punctures and stings

and reputed to draw the poison out. The 'Black Stone' is really a piece of carbonised bone, and these are supplied to Roman Catholic missionaries by a mission procurer in Belgium (Shorter, 1979). As far as I knew no one in Utengule had one—the White Fathers were infrequent visitors—and people were a little disappointed that I did not have one myself. There are presumably many other local treatments which I did not record.

A fuller account of these and other aspects of Sangu ethnoherpetology must await future research. I hope that the notes I have provided in this paper will form a useful starting-point for this work.

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THE IMPORTANCE OF BRYOPHYTE CONSERVATION IN KENYA

Bryophytes have received little attention as they are relatively small and inconspicuous plants. They are noticed when they form extensive green carpets in places with high humidity, especially on our mountains.

Our mountain regions predominantly serve as water catchment areas. Abundant rain falls all the year round promoting a luxuriant growth of bryophytes. These bryophytes swell up with the rain water; the retained water by these small plants is then slowly released into the ground, eventually finding its way into the rivers and streams flowing down the mountain. Bryophytes are, therefore, important in regulating water flow. The tropical rainstorms are usually heavy and the bryophyte cover on the ground and on the trees intercepts the destructive effect of tropical rains by absorbing a considerable quantity of the rain, and therefore also contributes to reducing soil erosion. Without the bryophyte cover on the ground, our mountain rivers and streams will be swollen, siltation will be considerable, thereby creating destructive flash floods.

The presence of bryophytes decreases the loss of water through evaporation (Pócs, 1991). Water that is intercepted by the moss-lichen cover is released slowly; at the same time the cover of mosses and lichens reduces water loss through evaporation especially from the soil surface. This preserves soil moisture and ensures a continuous supply of water to the watercourses.

In our montane forests and especially in the "mossy" or elfin forests where *Hagenia abyssinica* is the dominant plant species, the trees' big branches are fully loaded with bryophytes. The thickness of bryophyte cover usually exceeds the diameter of the branches. This cover has an interception capacity much higher than that of the foliage (Pócs, 1980). The interception capacity of the moss cover is 400–500% of its dry weight in comparison to 60–175% of the dry weight for the foliage. Pócs estimated that the moss-lichen cover in the Uluguru Mountains can intercept during one rainstorm upwards of 50,000 litres per hectare, which is approximately 40% of the annual precipitation. In comparison, the canopy foliage intercepts 6,000 litres of water per hectare during a single rainstorm.

Therefore, the lower plants as a whole play an important role in water interception and water retention in the montane forests where bryophyte diversity and abundance is at a maximum. This ensures a permanent water supply to numerous streams and rivers that flow down the mountain and supply the myriad farms found below these forests.

Humus production by the epiphytic communities of our forests is important. Pócs demonstrated that the biomass of the 'aerial' humus in the Uluguru Mountains of Tanzania is equal to 2,453 kg dry weight per hectare. The continual rain of aerial humus contributes to the fertility of the soils.

Bryophytes are indicator plants. *Leptodon smithii* is always found in areas with low rainfall, while *Hypopterygium viridissimum* flourishes in wet localities. *Polytrichum piliferum* and *Sphagnum davidii* are abundant on acidic substrates. Some species have been used as indicators of atmospheric pollution in industrialized countries. This area has not yet been investigated in Kenya.

As bryophytes possess a short life cycle they are usually selected for molecular biology experiments. They are widely used to pack live plants for export as they retain moisture for long periods. Packing plants for flower arrangements and floral shows are common and this has contributed to

widespread denudation of the forests around Nairobi of their bryophyte luxuriance.

We need to preserve bryophytes in their natural habitats as a considerable number of them are afroalpine endemics: they are only found on the mountains of East Africa—the Rwenzoris, the Virunga Mountains, Mt Elgon, Aberdars, Mt Kenya, Mt Meru and Mt Kilimanjaro. Bryophytes play a very important role in the interception, regulation and retention of water on our mountains, in the protection of top soil from erosion and in the production of humus, making available additional nutrients to plants. Bryophyte conservation (among them, many afroalpine endemics) is of utmost importance.

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Field trip report

ETHIOPIA— A GLIMPSE OF AVIAN RICHES

Ethiopia is a huge country, the size of Tanzania and Uganda put together (and twice the size of Kenya). Long isolated from the rest of East Africa, its immense upland plateau has evolved a strange and distinctive community of animals and plants. If one includes Eritrea, and thus the plateau's northern edge, at least 23 bird species are endemic. The history and culture of the country are equally fascinating, with ancient traditions built around the Orthodox Christian church. Equally important to some of us, the food also has an exalted reputation!

So the prospect of a visit to Addis Ababa for a BirdLife International meeting, with colleagues from all over Africa, was very exciting. My enthusiasm was dampened somewhat on seeing that, according to the programme, we would be incarcerated in a hotel for the entire week, with little chance to escape and go birding. This indeed proved to be the case—but it's difficult to keep a group of fanatical birders down. Our hotel, the Imperial, was on the edge of Addis, very close to the airport. Indeed, from the window of my room I could see, rather discouragingly, a couple of burned-out airliners that appeared to have fallen off the end of the shortish runway. Beyond this was open fields. On our first evening, we drove past the wrecks and down to a small stream in the open plateau. Dozens of White-collared Pigeons, white patches flashing in their wings, flocked to drink and roost in an old gravel pit. Abyssinian Longclaws, with black-lined yellow throats and streaky upperparts, paraded over the short grass plain, while chunky Red-breasted Wheatears kept an eye out for insects. The weather was perfect, a cool, sunny spell after the previous month's showers, and before the heavy rains of June set in. At 2,300 m or so, the plateau felt similar to the area north of Nanyuki, or around Eldoret: high and dry, with the air gentle and fresh. As the sun began to set, a pair of Blue-winged Geese flew low towards us, then zig-zagged away as a male Egyptian Goose rose in loud protest to defend his stretch of the little river. When they landed we could see their odd short necks and bills,

quite different to any other African goose and giving them an odd atavistic appearance.

Blue-winged Geese, by Normann Arlott. Reproduced from African Bird Club 2(1)

Even the marshy grassland around the hotel, popular with early morning joggers, had its share of interesting birds. The most outstanding species was undoubtedly Rouget's Rail. Mackworth-Praed and Grant describe these birds as 'nocturnal, not often seen by day' and 'scuttl[ing] back into the reeds at the first alarm'. Not so the ones at the Imperial Hotel: indeed, these are the only rails I have seen that run towards one, as if to make sure that one obtains a decent view. They are handsome birds, considerably bigger than a Black Crake, with rufous underparts and a conspicuous bright flash of white under the tail coverts. At least three family groups occurred along a small drainage line, with scanty covering vegetation, around a hundred metres in length. Their loud reeling cries were hard to miss in the mornings.

Also in and around the grassland were Groundscraper Thrush, a bird that misses out Kenya and reappears again further south; the Pale White-eye, the local, grey-bellied version of *Zosterops poliogastra*; the Abyssinian Longclaw and Red-breasted Wheatear, again; and Swainson's Sparrow, the local version of the Grey-headed, a dainty little thing with very uniform warm brown back, wings and upper tail. Pectoral-patch Cisticolas zipped through their aerial display flights high above us. I was also pleased to see the genuine, original Baglafecht Weaver, the nominate race of the bird we used to call Reichenow's. It is startlingly different, with a dull green, rather than black, back (and, in the female, crown). Altogether it is much less bright and colourful than Reichenow's, but it sounds and behaves very similarly, so no doubt the taxonomists have it right.

After several very exhausting days of workshop, a lucky few of us whose flights did not leave immediately had the chance to take a day trip into the countryside. We chose to go to Debrer Libanos, the site of an ancient monastery some 100 km north of Addis Ababa, and on the edge of the plateau. Very early in the morning we drove through the town, past the British Embassy compound (a large, forested lot apparently excellent for birding, but inaccessible), the no less impressive Kenyan Embassy, and onwards up into the surrounding hills. Planted Eucalyptus forest in various stages of growth surrounded us, and seemed to stretch for kilometres in all directions—necessary, no doubt, to fuel the city's several million people. As we crested the hills, at 3,000 m, Addis was displayed below us, a vast, sprawling and apparently formless city. Close to this spot the Emperor Menelik II, who routed the invading Italians in 1896, apparently set up base camp, and Addis sprang up on the plains beneath.

We now emerged onto a wide, high plateau that stretched vastly around us in gentle undulations, broken frequently by small streams and gorges. Wattled Ibis ambled beside the road, odd-looking creatures with their short legs and dangling, dark-red throat wattle. Each pond or stream had its pair of Blue-winged Geese. Brown-rumped Seed-eaters foraged busily in the ploughed fields; the brown rump is scarcely noticeable compared to the huge white

supercilium on these birds, but there you go. Black-headed Siskins, pretty little black and green birds, fluttered down to drink in the streams.

The plateau went on and on, but suddenly the land fell away dramatically in front of the road, where a gigantic gorge cut deep into the plateau. We turned off towards Debrer Libanos, perched a little way down the slope. A monastery has apparently existed here for more than a thousand years. The ancient church that stood on the site was destroyed by the marauding Italians, evidently good Christians; they also massacred all the monks on the rather odd premise that this was the quickest way to vanquish Abyssinia. A fine modern church with impressive stained glass windows, built around 1960, now stands on the site. Debrer Libanos is a major destination for pilgrims, who we found meditating under the palms in the quiet church compound or dousing themselves in the holy water piped from the sacred forest adjacent to the church. The sanctity of the forest has afforded it protection, but it is a few hectares only of low juniper and olive trees huddled between the church and the steep cliff behind. As in so many places, most of Ethiopia's highland forest has long since succumbed to human pressures.

We paid 10 birr (around KSh 80) to the church custodian, and wandered into the forest. It was not long before the endemic birds made themselves known. Like everything else in Ethiopia, the birds' behaviour is different. They don't fly away as soon as they see you, giving you perhaps a blurred glimpse of the tail feathers (and a feeling of intense frustration). Indeed, the main problem with most of our sightings was being too close to focus properly with the binoculars. White-rumped Babbler, friendly, noisy birds with white faces and brown chests, called and waved their tails a few metres up in the junipers. White-cheeked Turacos bounced about nearby in the low canopy, calling like a gentler version of Hartlaub's. A Black-headed Forest Oriole made sure that we could see the distinctive grey edgings to the flight feathers and its yellow-green central tail feathers. Just to dispel any final doubt it also called, a lovely liquid sound much more rapid and explosive than the call of the ordinary Black-headed Oriole.

A number of trees were in fruit and the wood was full of the burbling chatter of White-billed Starlings. These handsome birds resemble a well turned-out Red-winged Starling with a conspicuous white bill. We watched one flock of a hundred or two scatter down the hillside in a burst of blue and chestnut when a pilgrim passed under their tree. Among them were a few Slender-billed Chestnut-winged Starlings, perhaps nesting behind one of the nearby waterfalls.

Even the Lemon Doves, though not of course Ethiopian endemics, seemed tamer, wandering unconcerned a few metres from us on the forest floor. The local race of Rüppell's Robin Chat was in confiding evidence, smaller and browner than the central Kenyan race, lacking the slate colour on the mantle and wings and with a very long, broad white supercilium. As we emerged some hours later, a White-backed Black Tit foraged busily on a juniper tree a few feet away.

We went on a short distance to the very edge of the gorge, where a bridge built by Portuguese traders in the 16th century (and still looking as good as new) spans a narrow chasm. As we munched our sandwiches, a Lammergeier floated effortlessly along the cliff edge and back, rising a hundred feet with a mere flick of a primary feather. Gelada Baboons, peculiar-looking long-haired animals, systematically combed the hillside for edibles along with a herd of goats. An Abyssinian Ground Hornbill fluttered down, rather less gracefully than the Lammergeier, carrying food for its young into its nest hole in the cliff, the blue

wattles about its face glowing in the sunlight. White-winged Cliff Chats, another endemic, buzzed about on the rocks, if anything more handsome than their Kenyan counterpart, the Cliff Chat. The endemic Rüppell's Chat, all black with a white flash in its wings, perched at the cliff-top while Rüppell's Griffon Vultures soared overhead, completing a good day for Mr Rüppell. Hemprich's Hornbills flew about in their strange floppy fashion, as much at home here as on the cliffs near Lake Baringo.

Then back to Addis, the last endemic of the day—an Abyssinian Catbird on the hills above the city—and departure, far too soon.

A week is just long enough to realise that whether you are interested in nature, culture or both, Ethiopia must be one of the world's most fascinating places—and it is just a short, if rather expensive, hop from Entebbe or Nairobi. If you intend to go birding, Mackworth-Praed and Grant is essential (I forgot my vol. 2, and suffered for it); resign yourself to lugging it about. Williams is not completely useless, but nearly so. The helpful check-list by Urban and Brown, and Urban's handy guide to the endemics, are both out of print and seemingly unobtainable. The Ethiopian Wildlife and Natural History Society, the BirdLife International partner in Ethiopia, is active in wildlife conservation and natural history work. Any EANHS member planning a visit may find it useful to contact them at P.O. Box 60074, Addis Ababa; tel. + 251 1 516637.

My thanks to BirdLife International for making my visit possible, UNDP for funding the workshop, and the EWNHS for acting as our hosts.

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Short Communications

RWANDA—A YEAR LATER

Much has happened since violence erupted in Rwanda in April 1994. Three months of massacres and fighting ended in July with the exodus to Goma and its tragic consequences, all of which was dramatically recorded in the media. Since then, an empty country has gradually filled up again and, with the help of many foreign agencies, has moved towards rehabilitation: the new incumbents are actively taking over the reins from them. Things proceed falteringly and unpredictably but certainly forward. At present it is superficially quiet and stable and central Kigali is safer than many capitals.

While Rwanda shows little on the surface of the terrible events of last summer, this does not reflect the human suffering and losses nor the problems of resettling the traumatised population (as well as those returning after 30 years in the diaspora), of reconciliation and of reconstruction. Most homes were looted during and after the war and Rwandans and foreigners alike have had to find means of recovery.

What of the gorillas? They have suffered far less than the human population and a number of young were born during the conflict. Some of the habituated groups have moved to more distant areas but it is difficult to know whether this is a result of human disruption. The general health of the gorillas that can be visited is good. Internal tourism (visits by aid and UN workers) to two gorilla groups, despite the Parc National des Volcans being an area of high security, is providing some income for the country. Recent intense media interest will result, in the coming months, in plenty of visibility for the gorillas and welcome publicity for Rwanda on the screen and in photojournals.

What of the Volcano Veterinary Centre? Although the VVC building has been

destroyed, the work goes on. The forest and its wildlife are vital to Rwanda, not only because they attract visitors and much-needed foreign currency but also because they are ecologically important. However, the war and its aftermath have presented new threats. The risk to wildlife of infectious disease introduced by humans or domestic stock is greater than ever and likely to increase because of habitat destruction and social upheaval. An integrated approach to the region is required, linking the conservation of wildlife and habitat with the urgent need to feed and clothe the local population and to keep them healthy. The immediate goals of the VVC are therefore twofold:

- to reestablish the veterinary programme for the gorillas and wildlife, with particular reference to preventive medicine and health monitoring. The laboratory plays a key part in this work and standard procedures are being developed that, in addition to being applicable in the field, ensure consistency and reproducibility in terms of sample collection and processing.

- to explore ways of collaborating more closely with colleagues in other disciplines, especially those concerned with zoonoses and public health.

We first returned to Rwanda in July and set up home in Kigali in December, and are likely to leave the VVC in the summer. We hope that, despite the destruction and depredations of last year, our successors will inherit a functioning laboratory and pathology programme that can provide support for the VVC's long-established and internationally known wildlife veterinary service.

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ARABUKO SOKOKE FOREST DUIKER SURVEY

Arabuko Sokoke Forest is one of the last remnants of lowland forests on the East African Coast. It is located near Malindi, with the Galana-Sabaki River to the north and Kilifi Creek to the south. It covers an area of approximately 420 km^2. The Forest is one of the most important sites for bird conservation. It is considered to be nationally and globally rich in biodiversity.

Unknown to many is the existence of the rare Ader's duiker *Cephalopus adersi* in this forest. This is a small antelope, known to occur only on Zanzibar Island and Arabuko Sokoke Forest. As of now, its population numbers are not known and little information exists on their biology. The aim of this survey is to determine the conservation status and distribution of the Ader's duiker in Arabuko Sokoke, and initiate a study on its behavioural ecology. In addition, this survey will determine the distribution and relative densities of other ungulates in the forest.

Ader's duiker is sought by the local people because its meat is dry, 'sweet' and brings a good price in the market. Also, this duiker has a beautiful skin that every good hunter longs to possess. Therefore, it is imperative for every good hunter to prove his prowess by killing a *harake,* as it is called by the Giriama people. Another threat to this duiker is related to destruction of its habitat. Observations around Arabuko Sokoke indicate that the human population is increasing rapidly and this increase is having an adverse effect on the forest. The area around the forest has been converted to farming. The local people have been illegally harvesting the resources in this forest, hence destroying most of the natural habitat.

Information learned from the local hunters during the first phase of the survey indicates that the population of Ader's duiker has remained low for some time as compared to the other duiker species. According to the

hunters, Ader's duikers were readily caught in the 1970s; since the late 1980s, trapping success has been low. Since 1991, no confirmed sightings of Ader's duiker have been made in this forest other than my own sighting of one animal in the morning of 27 June 1995.

Andrew Williams, who is conducting a survey of small antelopes on Zanzibar Island, tells me that he has been able to capture only two Ader's duikers, and has sighted six, in the course of his work there. He continues to say that this duiker is under serious pressure from habitat degradation and over-hunting. Local hunters are competing to 'bag' as many Ader's as possible to gain *achile*.

According to the local hunters I interviewed in Arabuko Sokoke, Ader's duikers were successfully trapped within the *Cynometra* vegetation, especially on red soil. This information agrees with the findings of Williams from Zanzibar, where he reports that the Ader's duikers are limited to certain areas.

In conclusion, the only two regions where Ader's duikers are found are under serious threat from habitat degradation and population encroachment. In the two regions, Ader's are confined to certain areas. This indicates that the Ader's duikers are in danger of extinction unless stern conservation measures are taken immediately. As a start, this project is set to find out how many Ader's duikers are surviving in Arabuko Sokoke and what hope there is that they will survive.

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Book Reviews

Kenya trees, shrubs and lianas by H.J. Beentje. ISBN 9966 9861 0 3. Pp ix + 722. National Museums of Kenya, Nairobi. 1994.

Upland Kenya wild flowers. A flora of the ferns and herbaceous flowering plants of upland Kenya. Second edition by A.D.Q. Agnew & Shirley Agnew. Pp 374. East Africa Natural History Society, Nairobi. 1994.

At last two books have appeared in Kenya to assist in the identification of indigenous trees, shrubs, wild flowers and ferns. If you are looking for picture books on Kenyan plants then don't buy either of these books, as both are essentially keys. However, if you are a committed naturalist, botanist or an interested lay person who is prepared to come to grips with the anatomy of flowers in order to identify a plant, these books will be invaluable.

Kenya trees, shrubs and lianas by Henk Beentje (1994), published by the National Museums of Kenya, deals with larger woody plants (those that can grow to 2 m) and lianas in Kenya. Written to replace *Kenya Trees and Shrubs* (1961) by Dale and Greenway, hitherto the only book for use with Kenya's woody plants, Beentje has expanded the number of species covered from 1,000 to over 1,800. In addition, the keys have been simplified and modified to use mainly vegetative characteristics. However, there often comes a time when the floral parts

must be consulted and a strong light and a x10 or x20 magnifier are necessary for this.

The dichotomous main key leads the reader into ten plant groups where plants may be keyed to family or genus. Helpful diagrams of diagnostic features are found alongside the keys. From there the reader is led into the text where a plant may be keyed to species. A brief description of each species includes habitat, altitude, peak flowering season, a distribution map, local names in major languages and conservation status. A strength of the key a is that it does not require both fruits and flowers.

A comprehensive introduction describes the use of the keys and the distribution codes; the vegetation types are explained diagrammatically. While good line drawings appear alongside many of the species descriptions, several lovely paintings by Joy Adamson are the only colour illustrations in the book.

The one drawback of the book is the lack of a comprehensive glossary. The end papers give a small illustrated glossary but this will not be enough for the novice. A definite plus is the listing of plants by local names, which can be a shortcut to identification.

Upland Kenya wild flowers by A.D.Q. and Shirley Agnew (1994), published by East African Natural History Society, deals with the ferns, fern allies and herbaceous flowering plants of Kenya occurring at altitudes of over 3000 ft (915 m). This is the second edition of this book, first published in 1974 and which rapidly became out of print. The second edition covers 3,000 species of which 1,000 are illustrated, a considerable improvement on the first edition.

As with *Kenya trees, shrubs and lianas*, the key has been simplified and modified to use mainly vegetative parts. In the introduction, the authors suggest that the reader try to match the plant to be identified with one of the illustrations. This will work to a point but the reader must be prepared to tackle the key, which is relatively simple and easy to use, if positive identification to species is required. The main key leads the reader to eight sub-keys where the plants may be keyed out to family or genus. Unfortunately, both fruit and flowers are needed in some instances, so the user should be careful when collecting specimens. Species descriptions are simple and accompanied by altitude range and distribution. This book is assisted by a comprehensive glossary.

Both of these books are available from the EANHS office, the National Museums of Kenya and most good bookshops at approximately KSh 2,000 each.

Sally Crafter, P.O. Box 68200, Nairobi

Society News

Kenya Birds

Kenya Birds is a joint publication between Birdlife Kenya, a subcommittee of the EANHS, and the department of Ornithology of the National Museums of Kenya. It takes a popular look at birding and bird conservation in Kenya and provides up to date information. Launched in 1992 and produced twice a year, Kenya birds has gained popularity among ornithologists, bird-watchers, environmentalists and students at both national and international level. Regular features articles in each issue focus on particular themes.

The themes already featured are coastal birds and their habitats (1(1)), birds in and around Nairobi (1(2)), Lake Naivasha and

Hell's Gate (2(1)), Kakamega Forest (2(2)), birds of highland forests, especially those close to Nairobi (3(1)), Masai Mara (3(2)) and Olorgesailie (4:1). To contribute or subscribe, write to:

The Editor, *Kenya Birds*
Department of Ornithology
National Museums of Kenya
P.O. Box 40658, Nairobi
Telephone 742161-4/742131-4, Ext. 243.

Financial report—1994

The Society ended the year with an operational surplus of 71,643 KShs. Although this amount may seem substantial, the underlying figures of the accounts show that some decisive action has to be taken if we are to keep the Society's finances in a healthy position.

Our expenditure has increased by 65 % while our income only raised by 18%. This increase in expenditures is mainly due to growing costs of our member services (*i.e.* production and postage of journal, bulletin and newsletter) which have gone up 80% while the actual income through annual subscriptions fees from the same members only increased 14%. This is because of the soaring prices in Kenya for paper, photocopies, postage *etc.* due to inflation, as well as the production means of some of these items (photocopying instead of stencil copying; printed labels instead of hand-written, *etc.*). Luckily this negative balance is countered by a substantial income through donations and office sales. These are however, sources of income that are quite unpredictable.

Therefore the Executive Committee felt that we have no alternative but to recommend an increase in the subscription fees. We know that this is an unpleasant decision and that in these hard times, it may prove a heavy financial burden for some of our less well-off members. On the other hand, taking into account the cost of the services that the Society is providing towards the members, the fees were not really realistic in that they cover only a small fraction of the actual costs. We hope to be able to cover the additional costs through more aggressive fund-raising and will try to reduce the actual expenditures and/or find alternative funding. We also hope that our current members can support us in these matters, especially in our never-ending search for sponsors. Any ideas or suggestions are welcome.

Looking into the future, the Society is expanding enormously as far as its own activities and that of its subcommittees are concerned. This has some financial implications. For example, the Society is undertaking some activities that need a substantial input of our savings in the hope that we can recover them in a later stage (*i.e.* the recent publication of *Upland Kenya Wild Flowers*). This means that we have to dip into our deposit accounts for pre-funding and thereby lose interest attributable to the General Fund. This results in a substantial loss of income (interest contributed 15% of our total income in 1994).

The ever expanding number of activities from the Society's bodies also means an increase in administrative services, telephone costs and other office expenses. We hope however to compensate for these extra costs through alternative sources of funding like overhead costs for projects administered through the Society.

We believe that the Society can look towards a healthy future but that we are in a transitional period at the moment—a time where the Society is broadening its scope and array of activities and involvements. But we look at these new challenges optimistically and hope that the continued support of our members will make it possible for us to survive the next year financially.

Marc De Meyer, Treasurer EANHS

MEMBERSHIP

This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society-National Museum Library (postal borrowing is possible) and a copy of the *EANHS Bulletin* every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

JOURNAL

The Society publishes, in collaboration with the National Museums of Kenya, the *Journal of East African Natural History*. The *Journal* is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Editor, Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

EANHS BULLETIN

This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), Box 44486, Nairobi, Kenya.

SCOPUS

The Ornithological Sub-committee publishes this journal three times a year, cost KSh. 600 per annum. All correspondence to D.A. Turner, Box 48019, Nairobi, Kenya.

BALLYA

This bulletin is published three times a year by Succulenta EA, a division of the EANHS. Members of the EANHS can join Succulenta EA, at a cost of KShs 400 per annum, and receive *Ballya*. Contributions for *Ballya* can be sent to Edward Vanden Berghe, Box 44486, Nairobi, Kenya.

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*Only children under 18 and full time university undergraduate students. Graduate students must register as full members.

Subscriptions are due on 1 January. From 1 July you may join for half the yearly subscription and receive publications from that date. Application forms for membership are obtainable from the Secretary, P.O. Box 44486, Nairobi, Kenya.

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Kenneth Young

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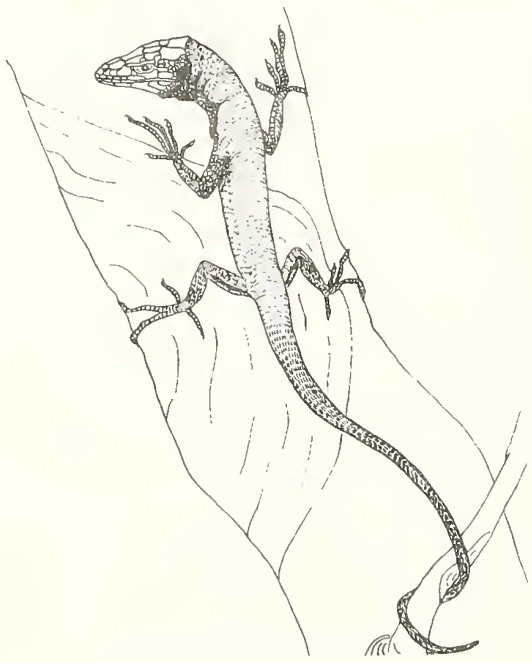
Articles and Notes

SOME NOTES ON *GASTROPHOLIS PRAESINA*

These are aboreal lizards, bright green dorsally, more yellowish green ventrally and with grey femoral sections, the grey being more pronounced on the underside. Two of our captive specimens are about 35 cm in length. This seems to be the usual size of adult specimens. There does not seem to be any sexual dimorphism apart from the breadth of the tail root, which is broader in males. These lizards are slender and a large proportion of the total length is tail. They bear a resemblance in shape to the Nile Monitor, *Varanus niloticus* (quoting Karl Schmidt, *Herpetology of the Belgian Congo*). They are very flexible and the tail is highly prehensible and much relied upon when climbing. They are seen frequently to be resting or asleep holding on entirely by their tails.



Gastropholis praesina

Notes

There appears to be no record of these lizards existing in the Kenya Coastal forests until 1985. In December of that year (13/12/85) a specimen was brought in. Unable to identify it we wrote to Dr Arnold of the British Museum (Natural History) with a description. Dr Arnold suggested that the specimen was *G. praesina* and sent a photograph of a juvenile that had been taken only a few weeks before in the same forest complex. This remained the only specimen we had for five years and during this time it laid five infertile eggs. Regrettably it died within a few days of our obtaining a second specimen that was a male.

Incubation and young

Two specimens were caught from the same location, a hole about 12 m up in a *Trachylobium verrucosun* tree on the edge of the Sokoke Forest, the first of the two on 21/6/94 and the second on 23/6/94 by Mr P. Mashauri, a junior officer of the Forestry Staff. These were placed in the same vivarium and not seen to mate but may have done so unobserved. On the 20th September, 1994, five eggs were laid but these were scattered and all but two badly damaged. The undamaged eggs were put into a makeshift incubator in our laboratory. Incubation temperatures were at the seasonal ambient, 26 to 29 °C with high humidity.

On the morning of 24 November, 1994 the two eggs were found to have hatched. The young lizards were very active. The colour was as in the adults (bright green but a yellowish green below noticeably more so below the head), but the line of fine black spots on either side in the adults was not visible in the neonates.

Immediately after hatching the young were measured. Due to their activity an exact measurement was difficult. However we found the total length to be 115 mm, 37

mm head and body and 78 mm tail. Unfortunately the eggs were not measured on being laid but they seemed to increase in size as incubation progressed. After hatching the length was found to be 17mm. The eggs were much like birds' eggs in shape, one end tending to be slightly acute.

Disposition

These are aggressive little lizards and bite quite hard when handled, but soon become habituated if treated with compassion. A gecko was put in the same vivarium and the lizard chased it until the gecko dropped its tail, which the lizard promptly ate. They will attack anything they believe to be attackable if cornered and sometimes even when not, for instance, when trying to measure one, it attacked the ruler. Two males put together invariably fight. We have one male specimen lacking a tail that was bitten off by another male. They appear to be intelligent and rapidly learn to associate movement of a cage door with food and to take proffered food from long forceps. Anything new in their vivarium is carefully inspected as soon as it is placed in it.

Breeding

A mating pair in a vivarium was disturbed accidentally when the door was opened for feeding. S. Ashe noted: 'I saw a movement of two lizards dropping from higher branches. When I checked, the female was climbing back up with difficulty because the male was on her back and the branches of the cage furnishing were thin. He had a firm grip with his mouth on the back of her neck and his truncated (but re-growing) tail was twined round hers. She came to rest on a thin twig with her front feet over it, her body hanging off to one side with only the toes of the upper hind foot holding the twig. The male suddenly shifted, his head going down to her groin, and his own vent was under hers, his tail curling up and past his own ear so that he was encircling her pelvis. I could not see if copulation was taking place, nor could I see if he was licking at her vent though his head was in the correct position and he appeared to be doing so. After a minute or so his rear end dropped away and he held her with a bite across her hips. She hauled herself up a bit and he released her.'

Conclusion

Information about these lizards seems to be difficult to find so we hope that the above will be of some assistance. Our principal informant on behaviour in the wild, Mr Mashauri, has a few of these under observation in the forest and they all seem to live high in the trees where they are not easily spotted by casual searchers. We therefore assume that although they are not particularly common they are not rare. Our experience shows that while they do venture on to the ground they are in fact highly arboreal and can safely be called an arboreal form.

Acknowledgement

First we would like to thank the two villagers who have brought in specimens from their orchards but most particularly Mr P. Mashauri who not only brought two specimens in but took great interest in our project. I would also like to thank the KWS warden, Mr. Kirui, who took a very sporting view when he found that Mr Mashauri had supplied us with a pair of these interesting lizards from the forest edge. Also Dr Nick Arnold of the British Museum and Dr Kim Howell of Dar es Salaam Museum. We have presumed on their valuable time and hope to do so even further in the future.

James & Sanda Ashe, Bioken Snake Farm, P.O. Box 3, Watamu.
Illustration by L.A. Depew

Declining riverine woodlands of *Acacia xanthophloea* at Lewa Downs, near Isiolo.

I visit Lewa Downs, near Isiolo several times a year in the course of my work as a landscaper. Over a number of years I had made several observations regarding elephant damage to *Acacia xanthophloea* trees. Since I had mentioned to David Craig, the ranch owner, that I believed factors other than wanton damage were involved, he asked me to write down for him some of these observations.

The following year, a researcher compiling material to be used in the BBC TV Series 'The Private Life of Plants', presented by David Attenborough, came to talk to me about various aspects of dryland vegetation. Amongst items we discussed was the possible interaction outlined here and, fortunately, I was able to show him some textbook examples at first-hand. The material was subsequently used in one of the programmes.

It is generally agreed that these woodlands have become noticeably sparser during the past 10 years, with many dead or dying acacias now in evidence. Whilst it would be foolish to deny that elephants are playing an active role in damaging these trees, there are many other factors involved, and the observer should appreciate that detailed knowledge of these and of their interactions is very far from complete. It is, however, agreed that some form of active management of these areas should be undertaken. The following observations should be borne in mind whilst deciding upon a course of action.

1. The natural growth cycle of *Acacia xanthophloea* woodlands

Mature woodland will be seen to comprise mainly trees of a peer-group. There is no regeneration of young trees beneath an even woodland canopy. Once this canopy is significantly thinned or disappears altogether, whether through old age, disease or predation, potential regrowth of young trees appears to delay until after the initial take-over of the area by pioneer vegetation has subsided. This may be due to some or all of the following:

- Presence of a chemically specific germination inhibitor in the top-growth of mature trees (not uncommon)
- A reluctance to compete until more favourable growth conditions arise
- A prerequisite for prolonged exposure to sunlight and to weather before the fallen seed can germinate satisfactorily.

Once the pioneer vegetation loses its initial vigour and grasses begin to invade the area, a large population of seedlings appears, more or less simultaneously. Competition thins the less vigorous specimens within the first five or six years. I was much interested in David Craig's observation of an elephant herd doing a sterling job of culling the less-vigorous young acacias in an area of regrowth, and of spacing the remainder.

Young woodland, again comprising peer-group trees, grows up. An excellent example of young woodland regeneration may be observed in Lake Nakuru Park around Naishi Sub-HQ, where a few gigantic (and dying) 'dinosaurs' from a previous generation remain.

Broadly, the cycle would appear to be from 35 to 50 years, depending on local conditions and the overall health of the woodland. As in all monocultures, *A. xanthophloea* woodland appears vulnerable to mass-attack by pests and/or disease. In Amboseli, borer damage has, in many trees,

been followed by some sort of fungal or bacterial infection of the heartwood causing gushing exudations of foul-smelling, fermenting black resin, beloved by both ants and baboons.[1] Mature trees, once infected, appear to die within a few years. I have looked for this at Lewa but, mercifully, have never found it.

The above factors may or may not be applicable to other acacia species, which I have not observed sufficiently in woodland situations to make valid comment. Certainly new germination within canopy areas of mature trees appears to be inhibited, even in savanna.

2. Predation by Insects

All acacias are host to a vast spectrum of insects (try working on them!), many of which do not seriously damage the trees. Leaf-eating beetles appear to do little long-term damage, and regrowth is fairly rapid. Chief culprit where structural damage is concerned appears to be the longhorn beetle, of which *The Wilderness Guardian* says "...Eggs are laid in cracks...hatched larvae are cannibalistic and the few which remain after devouring each other, tunnel into the wood, where they may live for up to four years. Tunnelling larvae seem to be able to avoid each other as they bore through the wood and this is probably due to vibration-sensitive organs on their bodies which alert them to the gnawing noises of neighbouring larvae...".

I have rarely observed longhorn damage on *A. xanthophloea* outside areas of high water-tables, but it is extensive around Lakes Naivasha and Nakuru and in Amboseli, as well as around the river and swamp on Lewa.

The most casual observation in these areas reveals a characteristic 'limp wrist' effect, particularly on lower branches, where internal structural damage causes them to bend and, frequently, to break once they can no longer bear their own weight.

Closer inspection, particularly where a break reveals a section of the inner wood, shows that apparently sound wood is, in fact, riddled with tunnels tightly-packed with damp sawdust, which may be scraped out with a hard implement. On dead trees, where rain has washed tunnels and perforations clean, damage is immediately obvious.

From my own experience in Amboseli, the health (and therefore, presumably, the life-expectancy) of affected trees, can be greatly-improved by active husbandry:

- Removal of severely-affected branches
- Filling exposed tunnels and exit holes with insecticidal solution - preferably pyrethrin-based, as these are bio-degradable and non-toxic to warm-blooded creatures when used at correct dilution rates.
- Sealing all cuts and tunnels with lead-free bitumen paint, i.e. that formulated for drinking water tanks.
- Where infection has penetrated (easily-detectable by the foul smell) flushing holes with clean water under pressure, then filling with systematic fungicidal solution (I used Bayleton) before sealing.
- Spraying the trees' (living) bark with foliar feed, mixed with Bayleton where applicable.
- Corrective pruning, to improve the tree's habit, to remove surplus, crossing or overshadowed branches, and to directionalise the future growth pattern.

Without exception, trees respond dramatically within the first month. Those up

[1] I believe that this infection is a more valid reason for the decline of *A. xanthophloea* trees in Amboseli than the commonly believed "salts in the rising ground water table." *A. xanthophloea* is tolerant of both salinity (Lake Nakuru) and high water tables (its natural preference is for riverine and riparian situations).

to about ten years old doubled both height and spread within a year, and recurrence of problems was rare.

When camping in areas with a high population of longhorn beetles, I have noticed that they have a fairly specific emergence time of around 8 pm. Use of ultra-violet insect traps between then and say 9:30 pm might therefore prove a useful means of control without causing wide spread damage to other night-flying insects.

3. Predation by Elephants

Major damage to newly-grazed *A. xanthophloea* woodland appears to be largely confined to trees with serious infestations of longhorn beetle, with comparatively little to unaffected trees, but methodical examination could better confirm this.

Newly-damaged specimens of *Acacia drepanolobium*, *A. abyssinica* and *A. nilotica* observed in January 1992 were (with a few exceptions) severely infested by wood-boring insects. Some tunnels appeared to be consistent with the usual diameters for longhorn larvae — about a finger's diameter. Smaller-gauge tunnels are commonly seen in trees growing in drier situations away from water, and may be caused by other wood-boring insect species.

In gardens both on Laikipia and on Lewa Downs, which are accessible to elephants, I have worked on sickly and damaged *A. xanthophloea* and *A. nilotica,* treating and correctively-pruning them back to shape. Interestingly, elephant damage to these trees thereafter has been minimal — instead of breaking off large branches as they had previously been doing, they confined themselves to stripping leaves from a few branch terminals

Discussion

Elephants' sensitive hearing may enable them to distinguish the sounds of wood-boring larvae (and/or beetles) at work, and they may well have learned to associate these sounds with easy food. Cynthia Moss' later comment, after I had put the idea to her and asked her to keep an eye out for borer damage on trees badly damaged by elephant was, "I definitely think you could be on to something."

We are still much in the dark regarding the huge number of interactions that comprise any ecosystem, although on the basis of clearly observable points raised so far, it may be reasonable to suppose that one of the elephants' roles may be to cull unhealthy trees, thereby speeding the cycle of regeneration in woodlands of *A. xanthophloea*, and maybe of other acacias, by opening up the ground for earlier germination of scattered seed. Passage through the gut of an elephant is also a factor likely to improve the germination rate of acacia seeds.

Considering the appalling condition in which many ailing acacias will struggle to survive, forcible culling of these by elephants could speed the regeneration cycle by a minimum of five years, and very possibly more.

In view of elephants' awesome feeding capacity, this would be of obvious benefit in ensuring a more rapid succession of major food sources, and of considerable side-benefit also to the many other creatures for whom the Acacia family affords home and/or sustenance. It is interesting how, particularly in dry years many herbivores, notably giraffe, will follow a feeding herd of elephant for the left-overs.

In the days when the whole country was open to migratory herds of elephant, it is quite possible that they were the housekeepers of Africa, varying their routes within a cycle, so as not to overgraze an area, and to allow periods for regeneration between. The recent appearance of elephant in Limuru, where they have not been seen for many years, but appeared to know exactly where they were going, may be relevant. In less populated areas, elephant

could have been of immense benefit to the continued health of acacia populations and, probably, of other tree species as well.

One might argue that it is now enclosure that forces them to overwork areas still remaining to them.

As far as I can ascertain from asking a fairly wide representative group of people, there has been no study of elephant-acacia-wood borer interaction, although I am told that a Dr Darling of Edinburgh University had put forward the hypothesis in a paper (sometime in the late 1950's or very early '60's, which was never followed up), that elephants have a role in speeding acacia regeneration cycles.

Dee Raymer, P.O. Box 56685, Nairobi

The Spider and the Flies: Observations From an Urban Ecology

The Urbane Ecologist

Urban ecology? In Kenya? Urban ecology may be an apt concern in New York, London or Tokyo, but in Nairobi it is overshadowed by a hinterland that is close enough and romantic enough to draw most people's attention most of the time. Well, not quite everyone all the time. Sometimes my attention wanders back to Nairobi and I am amazed and fascinated by what is transpiring under my very nose.

As an archaeologist, I have a somewhat different view of man's place in nature from that of the conventional conservationist. Perhaps I can illustrate this point by reference to a popular film that many of you may have seen: *Time Bandits*. In the film, the characters travel back in time and visit a number of places. What I found attractive about all these places was that none of them was new and shiny *in their own day*. For example, in ancient Crete, the frescoes were chipped and the hem of the royal robe was frayed just a bit. and the architectural lay-out was somewhat out of date for the manner in which the space was actually being used.

Like every place else in the last 10,000 years, ancient Crete was having a hard time keeping up with its human occupants. In fact, the people were having a hard time keeping up with the changes they, themselves, were creating. Archaeologists call this displacement *cultural lag* and it is a feature of all known cultures. It is also a special case of a more general problem that we might call *ecological lag,* which occurs when one part of an ecological system changes much faster than the connected bits. And the biggest and most disconnected symbol of this problem in East Africa is NAIROBI. Let's pause and think about that for a moment....

At first glance Nairobi seems completely out of place in the African savanna, an artificial construct that makes less sense than a cubist painting floating in an impressionist pond. However, regardless of what we desire, Nairobi is the future. If you want to know what the African countryside will be like in 100 years, study Nairobi. It is the ecological rules of the city that will permeate and transform the surrounding savanna. To survive, the plants and animals of this countryside will have to find places for themselves in the new ecology. Indeed, this is already happening. Have you noticed that Hadada Ibis, over the last three years, have learned to live off of our scattered refuse; they are finding their place in the new order of things.

If you can suspend for a time your horror and rejection of the future, the creation of this urban ecology is a fascinating process. The stories of its creatures, their personalities and lives, are just as compelling as any from the savanna. And anyone can observe these lives. The observations below provide an example that I hope you will find both amusing and revealing. It comes from the ecology of my kitchen and yours. It concerns creatures who live in our homes with us because of the niches we have created inadvertently for their exploitation. It concerns the relationship between the small hunting spiders who stalk our world and the fruit files we provide for their sport and, sometimes, food.

The Spider

The spider in our little drama is the common hunting spider; not the large long-bodied kind, but the small blocky sort between 3 and 7 mm long. These little guys are big in front and small in back, with short but springy legs that allow them to hop several centimeters. They do not live in webs, but patrol territories, looking for insects smaller than them in order to eat. I know this because I have observed very regular patterns in their movement and traced these movements back to territorial centres. Typically, the centre of a territory is a large stationary object that provides concealment and access to surfaces frequented by small insects. Windows, cabinets and large pieces of furniture that stand close to walls are favoured territorial centres.

From such a centre, the household hunting spider may forage for up to three metres, a distance that usually brings it into the territory of a neighbour. Foraging patterns are quite regular. For example, a spider who once occupied the window next to the computer table at which I am now writing, once had a foraging routine that coincided with my late afternoon writing schedule. She would appear from beneath the corner of the table, cross to the printer, search its back and top, hop to the plug array on the surge suppresser, then to the wall where the calendar and light fixture would be searched, and finally across the wall and behind the drapes to the window. Sometimes this transect would be varied. From the corner, she would proceed to my keyboard, then the computer and slide scanner, and across the front of the table to my tea mug. Then it was back under the table to reappear on the wall near the drapes. This happened every day at the same time for more than a month.

Household hunting spiders are diurnal, but they do not like changes of light and shadow that suggest the movement of large creatures in their environment. They appear to avoid times and places where such changes in the hunting light occur. Hence you may be living in the same space with these fellows but not know it. You can treat the occasional hunting spider you observe as an intruder. This is, of course, self delusion, a charming behavioural characteristic of humans that promotes the development of the local urban ecology.

Hunting is opportunistic. The opportunities in my flat are commonly mosquitoes and fruit files. The success rate for hunting mosquitoes is very high. In fact, I have never seen a spider miss, but my sample size is too small to rule out occasional misses. On the other hand, the success rate for hunting fruit flies is very low, probably less than one percent. Nonetheless, spiders never pass up the chance to stalk a fruit fly. This raises some interesting questions. First, if predation on mosquitoes is so successful, what keeps the spiders from destroying this component of their food supply. There are two things at work here. First, the spiders do not generally recognize prey unless it moves. Therefore, they must see the mosquito land or they are unlikely to recognize it. Second, their territory is much larger than their radius of

effective observation, which is only about 25 cm. For this reason, most mosquitoes that land in the hunting zone of the spider pass through its territory without being observed.

The household hunting spider stalks its prey and then jumps on it from a distance of about 5 cm. Since fruit flies spend most of their time on vertical surfaces, this poses a certain technical problem for the spider. If it simply jumped off the vertical surface, the spider would continue over the fly and down to the floor below. It is the spider's solution to this problem that raises our second question. To hunt on a vertical surface, the spider approaches the fly from above, anchors a thread of silk that she spins from her abdomen, and then launches herself outward from the wall at an angle and with enough force to over-jump the fly by several times the distance that actually separates them. At the same time, she spins a taught line of silk and stops spinning when the thread is precisely the right length to translate the arc of the jump inward to the very point on the wall where the fly sits. This process actually accelerates the spider downward onto its prey while it blocks the most direct flight path from the surface of the wall. Yet, the fly almost always wins this contest. Why, then, does the spider persist? The silk belaying line is pure protein. Even though the spider retrieves the line by eating it, it still takes quite a bit of energy for her to digest and respin the line. If you have to do this one hundred or more times to catch a fruit fly, how valuable to you can that fly be as food? I don't know and have no practical way of measuring the energy dynamics, but merely asking myself that question made me think along other lines.

One such train of thought was the value of practice. Could the spider be practicing to maintain the skill necessary to successfully hunt less difficult prey such as the mosquito? I have a magnifying glass that is 14 cm. in diameter. It provided a clear and greatly magnified view of the hunt. Even so, the actual leap of the spider and the evasion of the fly occurred so quickly that I could not see what was happening or get a feeling for how much leeway the fly might have within the escape envelope defined by the spider's motion. However, by timing the approach of the spider and the length of time she allowed before the leap, I was able to predict to within about one second when the spider would go into action. And by turning on the fluorescent light in the kitchen just before the spider struck, I was able to increase the spider's success rate by several fold even though I could see no difference at all in the actual event. An increase in the light level just a second before the spider struck decreased the escape reaction of the flies just enough so that the spider would succeed about 3 times in 20 tries. From this I concluded that the spider must be missing the flies by such a narrow margin that any improvement would result in greater success. Practice, then, seems a reasonable hypotheses to examine further.

The Fruit Flies

Fruit flies enter the house with fruit. They also love bread and the plastic bags in which bread is kept, and sisal twine from which fruit has been hung. Fruit flies are calm and in no hurry. When in the air you can herd them by manipulating the personal flying space they like to maintain. You can even get them to land in a particular area if you are patient. This is how I created a sufficient number of fruit-fly/spider encounters to complete the observations above. As has been reported, fruit flies are also incredibly agile, but this did not prepare me for a particular type of behaviour in which they appear to be playing with the spiders.

The Drama

Fruit flies vary considerably in their behaviour toward other creatures. When attacked by a hunting spider one fly will

head for the ceiling where no further attack is possible, another for the opposite side of the room; but some will observe the spider from the air and then settle again well within its 25 cm. tracking range. The spider will immediately resume stalking the fly. In a typical stalk, the spider moves directly at the fly in a straight line. The distance is covered in a series of short sprints. The spider runs forward between 5 and 10 cm. and then remains absolutely still for about 30 seconds before sprinting forward again. Three or four such sprints take the spider within striking distance. There is another pause and then the leap, as described above. Certain fruit flies might land within the tracking radius of a spider as many as four times, inviting attack after attack. Considering the narrow margin of safety enjoyed by the fly in these encounters, this behaviour seemed rather curious. But it did not prepare me for the following observation.

One afternoon while preparing lunch, I was watching another hunt unfold, but this time, when the spider jumped, the fruit fly did a quick pirouette in the air and bopped the spider on the head. The spider did a quick 180 with forelegs raking the air, but to no avail. This happened so quickly that at first I thought my eyes had deceived me. But no, close observation showed that some flies routinely did this to spiders. Some settled back near the spider and repeated the performance two or three times in succession. When thought about at a human scale, this encounter is as dramatic as any between a lion and its prey. Yet, at the same time, it is comical - serious violence turned into a parody of itself. But why? Why should fruit flies play such a dangerous game with deadly serious hunting spiders?

Now, as an archaeologist, I am also trained as an anthropologist. One of the analytical tools that anthropologists make much of is participant observation, so it is not surprising that my first thought was to play spider in order to see just how interspecific this behavioural pattern might be. So, I set my forefinger down on the wall about 25 cm. from a fly, waited, and then sprinted it forward about 8 cm. I was all spidery predator, intent on my quarry, fully engaged. When it came to the leap, I was deadly serious: I would land on that fruit fly - splat - and nothing would stop me. Alas, I am not faster than the average hunting spider. Fly after fly eluded me with ease. But after about two dozen tries, one of the flies, bless its faceted little eyes, did a neat aerial somersault and bopped me on the fingernail. Joy! Elation! I had made a successful debut into fly society. But what did it mean? Bopping was not reserved for spiders alone. What else got bopped and what provoked it?

Lunging, I thought. But what else lunges at fruit flies? Other fruit flies, of course. I had, in fact, already observed this without thinking about it. Fruit flies in the same air space sometimes lunged towards one another. Looking more, I found that the object of a lunge would sometimes return the gesture with a quick counter lunge, but the sequence of lunge and counter-lunge was so quick, that I could not tell how close the flies came to one another. Time for more participant observation. I flew; I lunged - direct lunges, diagonal darts, the works! And then it happened. A fruit fly looped, rolled and bopped the side of my finger. Aha! So contact was being made. This suggests defence of territory might lie at the root of apparent spider baiting. If so, the spiders are not being treated so much as predators as they are competitors for the same wall space. Could it be that the flies are practising on the spiders, creatures nearly as fast as themselves, so they better cope with their fellow flies?

Male baboons who cooperate to control the dominance hierarchy of their troop are known to tree leopards on occasion. The leopards want no chancy encounters and sensibly retire, but what do the baboons

want? Are they protecting the troop, asserting territory and dominance within the troop, or practising the skills of cooperation and testing the limits of its effectiveness? Thinking about fruit flies and spiders leads outward, away from the urban ecology they inhabit and back into the savanna, which gave rise to the species that will all to soon transform or destroy it. Therefore, do not scorn the ecology and natural history of urban environments. Open your mind; follow your curiosity. You may find the city is far more interesting than you ever suspected.

Acknowledgments

The observations presented in this paper were made during my tenure at the University of Nairobi. I would like to thank the Council for the International Exchange of Scholars and the United States Information Service for their support through this programme Thank you.

Dr. Charles M. Nelson, Department of History, University of Nairobi

Short Communications

RAVENS WITH BIBS?

I was on a safari in the Mara last December (I think about the 7th) and was travelling with some American tourists between Sekenani and Mara Sopa Lodges. Our attention was drawn to a congregation of jackals, hyenas, vultures and ravens devouring the carcass of a Wildebeest. There were also some Tawny Eagles.

I noticed that amongst those scrabbling for food were two White-necked Ravens, which appeared to have white chests splattered with blood. On closer examination I discovered that in fact both Ravens had cloth "bibs" over their necks. The cloths were white with a red blob on the neck. I studied these two birds for some time through field-glasses, and got the impression that the "bibs" had been placed over their necks. They appeared to be quite happy and were not making any effort to rid themselves of these "impedimenta". It did occur to me that a barbed wait-a-bit thorn would easily entrap the bird. Do you think that someone was doing a research project or indulging in a good bit of "twitcher tormentation"?

Some years ago I wrote on the subject of seeing, I think it was, Fan-tailed Ravens with small silver (probably tin) bells attached to their legs giving out an enchanting tinkling noise as they flew around at a place called Melka Murri in Mandera District. The year was 1961.

Fergus McCartney, Gatua Nyaga, Box 4592, Thika

THE NAIKARRA WILD DOGS

Sometime in August, 1995, several close friends became very excited when I informed them about recent sightings of Wild Dog (*Lycaon pictus)* near our village in Naikarra area, next to Loita Forest — popularly known as Namina Engiyo Forest, in Narok District.

Packs of Wild Dog were a common sight 10 years ago. They disappeared mysteriously until recently. Since June, 1995, packs have been seen regularly. They live in burrows on Eseketeti Hill, about 3 km east of Naikarra Secondary School. The burrow has 10 entrances to probably 3 dens, one of which is about 200 m from the others. In June, also, 23

Wild Dogs were spotted from a plane around Leshuta area. One night in July, several students of Naikarra Secondary School saw a small pack in the school compound.

On August 15, scouts working for the Friends of Conservation (FOC) Black Rhino Foot Patrol and Monitoring Programme in Loita and Laleta areas came across Wild Dog spoor on Loolmong Hill, 4 km north east of the school. On August 20, the scouts encountered a pack near the aforementioned burrows and several of them lying under nearby bushes. The dogs were last seen at the burrows in mid-August, 1995. Since then (up to 19 September) they have been seen near the Empash and Leshuta areas, situated about 15 km south east of the school, catching Thomson's Gazelle (*Gazella thomsoni*) and other prey.

In conclusion, many local people living around Loita Forest concur that Wild Dog are "very common" in the area. However, no case of livestock depredation by the dogs has been reported by the locals. The animal is almost extinct in the nearby Masai Mara National Reserve, whose eastern Border is less than 25 km from the area. Wild Dog have only been seen in Aitong area, in the northern parts of the Reserve.

I understand that wild dogs have become rare in Kenya today, Hence my information suffices to surprise my conservation-minded friends at FOC.

If you are interested in further details, please contact me using the address below.

Nicholas Martyn, c/o FOC, P.O. Box 74901, Nairobi.

Field trip report

A VISIT TO SIMON THOMSETT'S RAPTOR HOLDING FACILITY

Simon Thomsett, who gave a very enjoyable talk at the last EANHS AGM, kindly invited members of the Society for a visit to his raptor holding facility at Athi River. There, he cares for injured, recovering and permanently disabled raptors of various kinds.

On 19 November, 1995, a group of 20 members of the EANHS went to Simon's facility at Athi river to see his birds of prey. The species of raptor we saw were Crowned Eagle, Peregrine Falcon, Lanner Falcon, Verreaux's Eagle, Saker Falcon, Tawny Eagle, Augur Buzzard, Wahlberg's Eagle and Barbary Falcon. A pair of Crowned Eagles with one eaglet was the highlight of the visit.

Simon informed us that the Crowned Eagle is a forest bird that generally breeds every two years. The female can lay up to two eggs, but generally lays only one. The main item in their diet is monkeys.

After the visit, the group had a very pleasant picnic lunch at a nearby seasonal river. We observed White-backed Vultures flying overhead and a Yellow-Throated Longclaw in one of the trees.

To top off the day, at four in the afternoon, six members of the group who had stayed behind returned to Simon's place to watch the feeding of the Peregrine Falcon, Lanner Falcon and Crowned Eagle.

Our thanks to Simon for his hospitality and to Major Kaigwa for arranging the trip.

Shailesh Patel, P.O. Box 26106, Nairobi

Book Reviews

Anacampseros, Avonia, Grahamia. A grower's Guide. By Gordon Rowley. ISBN 0 902099 29 9. Pp 80. Colour photographs 75 and black & white figures 19. British Cactus & Succulent Society, Fleet, 1995. Price: £13 (incl.. postage) from David Slade, 15 Brentwood Crescent, Hull Road , York YO1 5HU, U.K.

This attractively produced book is an account of three genera in the purslane family, the Portulacaceae. They consist of dwarf plants that are mostly quite inconspicuous in the field. As leaf succulents, in some cases with a tuberous base, they are sought by succulent plant hobbyists and at least one species has been in cultivation in Europe since the early eighteenth century. Although there is a lot of literature on them scattered in botanical and horticultural books and periodicals, until now there has never been a book devoted entirely to the group

As the title indicates, this book is intended not as a technical monograph, but as a popular guide. However, all the trappings of a monograph are there – literature references, synonymy, descriptions (including chromosome numbers) and identification keys. There are also introductory chapters on life form and ecology, morphology, family relationships, geography and evolution, and later chapters on native names and uses, and cultivation. The style of writing is aimed at the enthusiasts who grow succulent plants as a hobby, but the detailed contents will also make this book a valuable reference for the botanist. The illustrations include habitat photographs, close views of cultivated specimens, line drawings, and reproductions of figures in early literature.

The publication of this book follows closely on the same author's reclassification of the species concerned (in *Bradleya* 12:105-112. 1994). Until 1994 most of the species had been included in the genus *Anacampseros,* in spite of their having two distinctly different growth habits. The author now recognises 14 species of *Anacampseros,* 9 species of *Avonia* and 6 of *Grahamia. Anacampseros* and *Avonia* are found in southern Africa, with one species of *Avonia* also in Somalia, whilst *Grahamia* occurs in Australia and in Central and South America. With such a distribution it might seem inappropriate to use space in reviewing this book in the bulletin of the EANHS. Justification lies in the interesting distribution of a single species, *Avonia rhodesica.* Best known in Zimbabwe and Transvaal, this species has also been found in two localities in Somalia. Why doesn't this species occur in the large gap between Somalia and Zimbabwe? Perhaps it does, but such a small inconspicuous plant, looking more like a tuft of moss when not in flower, might have been overlooked. There are many seemingly suitable habitats in Kenya and Tanzania and so the hunt is now on, with the challenge thrown to members of Succulenta East Africa in a recent issue of their bulletin (*Ballya* 2(3):60-61. 1995).

A reviewer is normally expected to point out faults, but in this case the only error I have spotted is that the word "maintains" (split between pages 15 and 16) should be "maintain". However, I have one quibble over the reference to illustrations. The colour photographs, tastefully arranged in groups of up to eight on pages numbered along with the text pages, are referred to as plates. In bibliographical circles plates are whole-sheet illustrations printed separately from the text and numbered separately from text pages. Otherwise this is a well produced book, moderately priced, with a wealth of information, and it is highly recommended.

L.E. Newton, Department of Botany, Kenyatta University, Box 43844, Nairobi.

Request for Information

CHEETAH IN MASAI MARA

Humphrey Omondi is a first year Master of Philosophy student in Moi University, School of Environmental Studies. He plans on doing his project on the cheetah of Masai Mara.

Anyone with information on this topic can contact him at the address below.

H.R. Omondi. School of Environmental Studies, Environmental Economics Division, Moi University, P.O. Box 3900, ELDORET

AUGUR BUZZARD PROJECT—Naivasha 1995/96

The Augur Buzzard Project (ABP) is a two-year research study on the ecology of the Augur Buzzard (*Buteo augur*) in two main nesting habitat types (cliffs and trees) within the Lake Naivasha area. The project is funded by the Peregrine Fund inc. (USA), the Aga Khan Foundation (Switzerland) and Earthwatch (USA). Collaborating institutions include the National Museums of Kenya, University of Leicester (UK) and the Elsamere Conservation Centre (Kenya). The ABP aims to understand more about the species' distribution, abundance and ecological requirements (primarily with respect to habitat) so that an ideal Augur Buzzard habitat model can be constructed. This model will then be used in other parts of the country to predict whether habitat is responsible for lower Augur Buzzard populations.

Why augur buzzards?

The Augur Buzzard (*Buteo augur*) is one of East Africa's most frequently seen bird of prey. It is common in the East African highlands where it inhabits open moorland, mountains, forest glades, inland cliffs, cultivation and baobab country. Its distribution in Kenya ranges from the shores of Lake Victoria, across the eastern Rift Valley into the Tsavo plains before veering south into Tanzania. The bird is rarely found along the coast.

Very little is known about the biology and ecology of the Augur Buzzard. The late Leslie Brown, who studied raptors for many years described the Augur Buzzard as one of his favourite birds and had hoped to make a fuller study of it in the future. The bird has been unjustly neglected perhaps because it seemed abundant at the time. The Augur Buzzard has often been characterized as being a fairly common and locally abundant raptor. It has also been portrayed as a species that is well adapted to cultivated land and dense human habitation. A typical example is the super-abundant Augur Buzzard population that occurs along the Lake Naivasha environs, a region where intensive horticulture is practised.

Whilst the Augur Buzzard is today relatively conspicuous and abundant, it is in depressed numbers compared to the recent past. Between 1968 and 1972, road transects conducted along the Nairobi-Naivasha road by Cunningham van Someren yielded Augur Buzzard numbers that were well into double figures. Present (1993-1994) road counts conducted along the same road have yielded only two or three individuals. In the years between 1965 and 1967, Leslie Brown found marked differences in the numbers of Augur Buzzards between areas of plains/thornbush (one Augur Buzzard every 13 miles) and areas of cultivated/inhabited lands (one Augur Buzzard every 23 miles). These differences need to be urgently re-evaluated to determine the birds' present status within different areas around the country.

In some areas today, *e.g.* the central highlands, the decline in numbers is in the region of 24 to 1 while in others *e.g.* Lukenya and Athi river, it is 3 to 1. The Eagle Hill area in Embu has over the years also shown a marked decline in the number of Augur Buzzards. Leslie Brown attributed this decline to human population pressure.

According to Sorley and Andersen, who conducted a recent study on raptor diversity along different land-use in south-central Kenya, three reasons affect raptor density and diversity as a result of changes in habitat that accompany human land-use pressures. These are:

- overgrazing by domestic livestock resulting in the alteration of original vegetative cover. This potentially affects abundance and distribution of prey species;

- impact of cultivation because the original vegetation is completely replaced. Cultivation also involves the use of chemicals potentially toxic to raptors and other vertebrates;

- human hunting pressure through impacts on prey populations.

The extent of negative impact resulting from habitat alteration varies according to different ecological requirements of different raptor species. This present study has specifically chosen to focus on the Augur Buzzard for the following reasons:

- although the Augur Buzzard is locally abundant, very little is known about the behaviour and ecology of the Kenyan population. Only one study has been conducted on the Augur Buzzard; in the Matopos Hills, in Zimbabwe, which focused on the bird's breeding biology, its interspecific relationships and population density;

- the numbers of Augur Buzzards are declining in areas of intensive land-use;

- although adaptable in various land-use areas its adaptability declines when a threshold is reached. It is this threshold level that needs to be determined (hence data on habitat required);

- the Augur Buzzard is a highly conspicuous and easily censused raptor. It is also beautiful and charismatic, representing our natural world; it has also always been associated with farmers — hence the name "farmer's bird";

- individuals can be easily differentiated.

How can you help?

Well, all you need to do is help in collecting simple observational data pertaining to Augur Buzzard habitat. If you know of any Augur Buzzard nest(s) around the country, kindly let us know; we will send you a simple questionnare to fill out..

Also let us know if you think your home area was once rich in Augur Buzzards but where they are now rare. It is worth knowing that whereas birds of prey comprise about one-tenth of all bird species, they form nearly 20% of all the threatened ones. Do your bit for conservation, ...help us to help the Augur Buzzard!

Munir Virani, Augur Buzzard Project, Elsamere Conservation Centre, Box 1497, NAIVASHA. Tel: (0311) 21055

Society News

THE C.J.P. IONIDES MEMORIAL FUND was launched in 1973 with the aim of erecting an appropriate memorial to the C.J.P. Ionides, the famous herpetologist and naturalist, who had contributed so much to East Africa, especially the Nairobi National Museum and Snake Park. Contributions were received from many parts of the world. The plan at the time was to build a special enclosure in the Snake Park portraying an East African ecosystem and displaying relevant species of reptile.

Uncertainty over plans to modernise the Snake Park led to delays in implementation and in 1982 alternative uses of the Fund were proposed. In fact, other than the presentation of books to the Museum library, no action was taken.

The Fund has been accruing interest and there is now sufficient to permit an appropriate memorial, plus plaque, to be installed within the Snake Park. Discussions as to the form are in progress with the new Curator, Mr Owen Sumbu, and other interested parties.

The purpose of this notice is to inform those who contributed to the Fund that an appropriate memorial is being planned. Further details will be published in herpetological journals and elsewhere. Others with an interest in the life and work of C.J.P. Ionides may obtain information about the Fund by contacting one of the persons listed below.

John E. Cooper, Durrell Institute of Conservation and Ecology (DICE), The University, Canterbury, Kent, CT2 7PD, U.K.

Jonathan H.E. Leakey, Box 1141, Nakuru, Kenya.

Owen A. Sumbu, National Museums of Kenya, Box 40658, Nairobi, Kenya.

ETHNOBIOLOGY AND CONSERVATION OF CULTURAL AND BIOLOGICAL DIVERSITY is the theme of the Fifth International Congress of Ethnobiology, to be held in Nairobi, Kenya, 2-6 September, 1996.

The congress is open to all persons interested in ethnobiology – the science that deals with the relationship between people and their biological environment. This includes their perceptions, knowledge, traditional beliefs and practices, and management and utilisation of resources. Indigenous knowledge, traditional practices and local communities are recognised as essential components in the conservation and sustainable utilisation of biological diversity. The congress will thus address itself to the relevant articles in the Convention on Biological Diversity.

Registration fees for the 5th ICE are K.Shs. 1000/- for local delegates (K.Shs. 1500/- after 30 April), US $200 for international delegates (US $250 after April 30). There will also be a number of training workshops before the congress. Subjects include people and plants, human ecology, and biodiversity conservation network For more information please contact Christine H.S. Kabuye, Chairperson, 5th ICE, National Museums of Kenya, PO Box 40658, Nairobi, Kenya. E mail: biodive@tt.gn.apc.org, fax: (02)741424, phone: (02) 742131-4 or 742161-4.

MEMBERSHIP

This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society-National Museum Library (postal borrowing is possible) and a copy of the *EANHS Bulletin* every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

JOURNAL

The Society publishes, in collaboration with the National Museums of Kenya, the *Journal of East African Natural History*. The *Journal* is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Editor, Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

EANHS BULLETIN

This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), Box 44486, Nairobi, Kenya.

SCOPUS

The Ornithological Sub-committee publishes this journal three times a year, cost KSh. 600 per annum. All correspondence to D.A. Turner, Box 48019, Nairobi, Kenya.

BALLYA

This bulletin is published three times a year by Succulenta EA, a division of the EANHS. Members of the EANHS can join Succulenta EA, at a cost of KShs 400 per annum, and receive *Ballya*. Contributions for *Ballya* can be sent to Edward Vanden Berghe, Box 44486, Nairobi, Kenya.

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*Only children under 18 and full time university undergraduate students. Graduate students must register as full members.

Subscriptions are due on 1 January. From 1 July you may join for half the yearly subscription and receive publications from that date. Application forms for membership are obtainable from the Secretary, P.O. Box 44486, Nairobi, Kenya.

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Articles and Notes

MT TSHIABERIMU GORILLA CENSUS

Earlier this century the massif to the west of Lake Edward was covered with more than 450 km² of forest. A large number of gorillas *Gorilla gorilla* are said to have lived in this forest. Although it is probably a considerable over-estimate, Johnson (1931) suggested that 20,000 gorillas lived here. Today, all that remains are about 60 km² of montane forest off the northwest corner of the Lake. This area is known as Mt Tshiaberimu (c. 1,850–3,100 m asl) (fig. 1).

found 20 gorillas in four groups and estimated that the total population was no more then 40 animals. Dr Conrad Aveling (pers. comm.) conducted a survey of the gorillas of Mt Tshiaberimu in 1986 and concluded that no more than 20 animals remained. From 30 May through 7 June 1995 we undertook an ecological survey of Mt Tshiaberimu. Our main objective was to determine the numbers of gorillas in this highly isolated population.

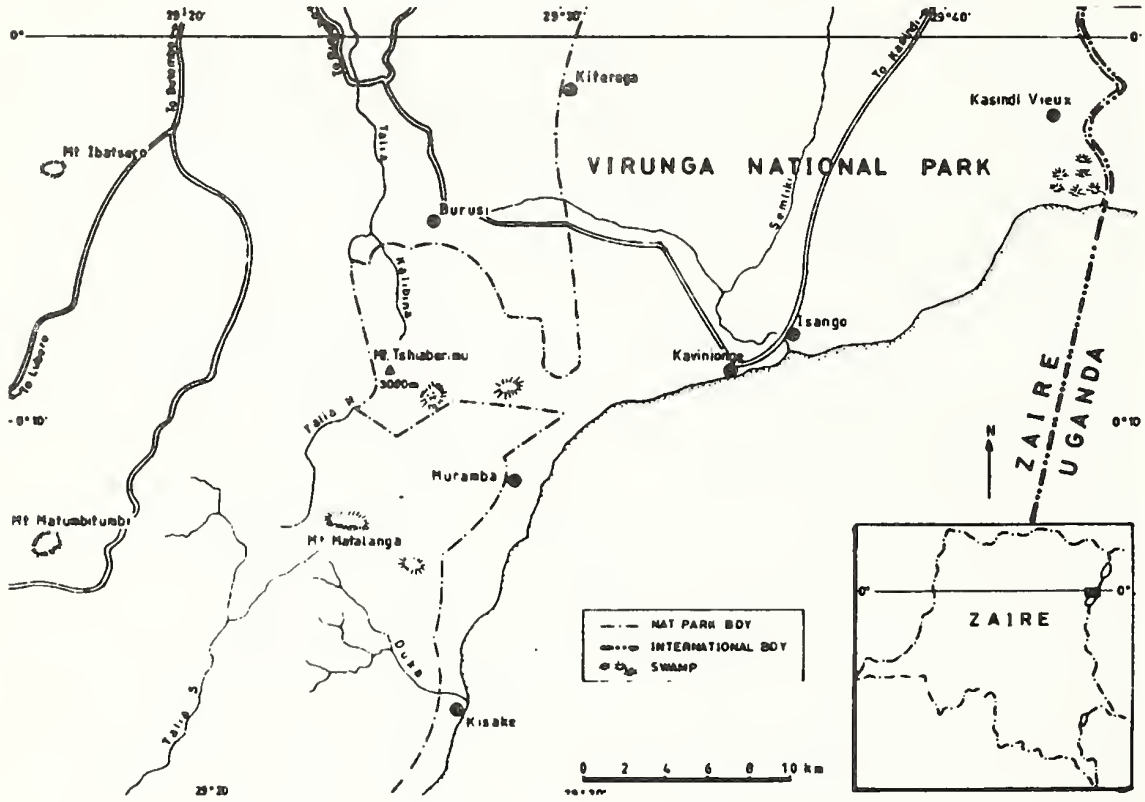

Figure 1. Map showing the location Mt Tshiaberimu within the Virunga National Park, Zaire.

Schaller (1963) spent two weeks on Mt Tshiaberimu in 1959 and observed a high rate of habitat destruction by agriculturalists and much hunting of gorillas for food. He

Three teams of guides and researchers searched Mt Thsiaberimu for seven consecutive days. Groups of four and 11 gorillas, plus one lone adult male, were

located. Our conclusion is that the total number of gorillas remaining here is 16–18 and that only two groups occur. They use an area of approximately 18 km² at 2,800 to 2,900 m in the southwest corner of Mt Tshiaberimu. This is an area dominated by high bamboo *Arundinaria alpina* and large podocarpus *Pordocarpus latifolius.*

Except for these 60 km² of montane forest, there is no sizable natural forest remaining in the region. Although Mt Tshiaberimu is part of the Parc National des Virunga, the corridor connecting it to the main portion of the park has been encroached upon and destroyed. There is extensive agricultural encroachment around the entire boundary of Mt Tshiaberimu and this is, undoubtedly, the greatest single threat to the area and its gorillas. Pit-sawing is another serious problem as more than 500 large podocarpus trees have been pit-sawn during the last few years. Poaching is at a very low level at this time but this is probably due to the low densities of prey rather than to any restraint by the poachers.

In addition to gorillas, we saw, or found evidence of, blue monkeys *Cercopithecus mitis stuhlmanni,* L'Hoest's monkeys *Cercopithecus l'hoesti*, black-fronted duikers *Cephalophus nigrifrons,* yellow-backed duikers *Cephalophus sylvicultor* and elephants *Loxodonta africana.* Signs of elephant were abundant throughout the area between 2,600 and 3,100 m.

The rangers estimate that about 30 elephants remain on Mt Tshiaberimu. There is probably no movement of elephants between this area and other parts of the park as the former corridor is densely populated with people.

During the survey, 16 of the 33 Albertine Rift Afromontane Region endemic bird species and subspecies were seen between 2,550 and 3,100 m. Two of these were species not previously known to be present in the highlands to the west of Lake Edward (Dowsett-Lemaire & Dowsett 1990). These are the Kivu ground thrush *Zoothera tanganiicae* and Shelley's crimson-wing *Cryptospiza shelleyi.* Both are listed as 'near-threatened' species in the Red Data book.

We are now making plans for a return trip to Mt Tshiaberimu in 1996 to continue our survey of the distribution and conservation status of the larger mammals and birds. In 1996 we hope to have the opportunity to survey the small amount of forest which still exists between 1,800 and 2,500 m in some of the larger valleys that run down the eastern side of Mt Tshiaberimu towards Lake Edward. While these forests will not hold gorillas, they are probably home to several more of the Albertaine Rift Afromotane Region endemic bird species and a few additional species of primates such as red colobus *Procolobus badius,* Angolan black-and-white colobus *Colobus angolensis,* Abyssinian black-and-white colobus *Colobus guereza,* chimpanzee *Pan troglodytes*, eastern needle-clawed galago *Euoticus inustus,* dwarf galago *Galagoides demidovii,* Thomas' galago *Galagoides thomasi* and Bosman's potto *Perodicticus potto.* In fact, we once heard one of the two species of black-and-white colobus during the present survey but it was too far below us to determine which species it was.

It is obvious that the forests of Mt Tshiaberimu, and the numerous species present there, are under severe threat from the surrounding human population. The Institute Zairois pour la Conservation de la Nature urgently requires conservation inputs from outside of Zaire if this important area is to have any long-term future. We recommend that

- immediate material and logistic support be provided to the 12 park rangers working to protect Mt Tshiaberimu and
- a multi-facted, long-term, conservation project for this area be initiated no later than 1996. In the meantime, we will continue to promote the conservation of this area as best we can.

Acknowledgements

This work was supported by Berggorilla and Regenwald Direkthilfe and Zoo Atlanta.

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ON THE PUBLICATION OF *CEROPEGIA INTRACOLOR* L.E. NEWTON

In the latest issue of *Bradleya*, yearbook of the British Cactus and Succulent Society, Prof. L.E. Newton (1995 b) published the new scientific name *Ceropegia intracolor*. This was given to a plant included, as No. V, in P.G. Archer's (1992) book on Kenya ceropegias, where it is simply called "Embakazi" after the collecting locality near the Nairobi international airport. Archer's book was recently reviewed by the same Newton (1995 a) in this Bulletin. The author of the new taxon wrote, among other things: "A living specimen collected in the Kitengela area, about 13 km WSW of the type locality (*Foresti 389–2*, cult.) probably belongs here. The tuber, stem and leaves match the type material, but the plant has not yet been seen in flower. It was growing among the roots of a small shrub, possibly a species of *Pentas*, in an area of rocky grassland near the north bank of the Kiserian River".

The plants (when collected, a small group of tubers) have flowered recently, after Newton's paper had been delivered to *Bradleya*. They are not *Ceropegia intracolor*, but—with the reservations hinted at below—*C. euryacme* Schltr., a close relative of the new taxon (Newton, 1995 b). *Ceropegia intracolor*—identified with the help of Prof. Newton—was in fact collected in the Kapiti Plains twice, in April and May 1995 (*Foresti 484 & 507*, cult.), after Newton's paper had been delivered to *Bradleya*. In both cases *C. intracolor* was growing in grassland on "black cotton soil" at an altitude of approximately 1720 m (5650 ft.) and was closely associated with (few centimetres away from) *Ceropegia crassifolia* var. *copleyae* (E.A. Bruce & P.R.O. Bally) H. Huber, which the author of the new scientific name has also found in the type locality (Newton, 1995 b).

The collecting localities of these living specimens are in the *Flora of Tropical East Africa*'s K6 area (Kajiado District). The specimens available in herbaria, cited by the author to determine the new taxon's distribution, are all in K4 (*Archer 145* and *Newton 4460*, type, in Nairobi District and *K. Wreford-Smith 1* in Laikipia District). The sole specimen *fide* Archer (1992) from K6 (Kapiti Plains) has not been found, either in the East African Herbarium (EA) or at Kew (K) (Newton, 1995b). Voucher specimens of one of the two mentioned clones in cultivation (*Foresti 484 & 507*) will therefore be deposited into those herbaria as a

confirmatory record of the presence of the newly named species in K6.

As to *Ceropegia euryacme*—sunk into *C. woodii* Schltr. by R.A. Dyer (1980)—L.E. Newton's option to recognise it as a distinct species "until a more detailed study has been carried out throughout the range of the taxa involved" (Newton, 1995 b) seems absolutely correct. This, of course, is if Archer's (1992) No. II ("Euryacme") is actually referable to *C. euryacme* Schltr. (Newton, 1995 b). The Kenyan material that can be identified with Archer's "Euryacme" appears to everybody decidedly distinct from, even though possibly somehow related to, the widely cultivated *C. woodii*.

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A STUDY OF THE DISTRIBUTION OF *CHARAXES* BUTTERFLIES IN THE ARABUKO SOKOKE-FOREST

Introduction

The following short paper is a by-product of the collection of certain butterflies from the Arabuko-Sokoke Forest for breeding at the Kipepeo Project. The results were obtained by enacting a basic system of *Charaxes* trapping and recording.

Method

Fifteen identical butterfly traps were set up 5 to 25 m from the roadside along the two main roads in the forest, five in each of three vegetation types: mixed deciduous, *Brachystegia* woodland and *Cynometra* forest. The mixed deciduous forest is the most diverse of the three, with four dominant species making up 62% of the growing stock: *Manilkara sansibarensis* (Sapotaceae), *Hymenaea verrucosa* (Caesalpiniaceae), *Afzelia quanzensis* (Caesalpiniaceae) and *Markhamia zanzibarica* (Bignoniaceae). In the *Brachystegia* woodland *Brachystegia spiciformis* (Caesalpiniaceae) is dominant (62% of the growing stock), followed by *Julbernardia magnistipulata* (Caesalpiniaceae), *Manilkara sulcata* (Sapotaceae), *Hymenaea verrucosa* and *M. sansibarensis*. Finally the *Cynometra* forest and thicket is dominated by *Cynometra webberi* (Caesalpiniaceae) (76% of the growing stock) followed by *M. sulcata* and *Brachylaena huillensis* (Compositae) (Gordon, 1993).

Four trapping sites were used, each of which covered all three vegetation types. Each site was trapped for one week. Traps were set up on Monday and collected on Friday afternoon, so that in four weeks all four trapping sites were covered. Traps were baited with over-ripe bananas mixed with palm wine. The mixing was done on a daily basis and all traps received the same bait. The

traps, once baited in the morning, were left for a minimum of three hours. All *Charaxes* butterflies caught were identified, recorded (table 1) and then taken to the Kipepeo Project. The study period lasted from 24 October–25 November, 1995; five weeks in all.

The only disruption to this routine was failure of transport or rain in the forest.

Results

Table 1 shows the numbers of *Charaxes* butterflies trapped during the study period. Fourteen species were caught in the three vegetation types. A Chi-square test on the seven commonest species (*Charaxes blanda*, *C. guderiana*, *C. lasti*, *C. zoolina*, *C. jahlusa*, *C. cithaeron* and *C. varanes*) shows that their distribution differs significantly between the three vegetation types. (Chi-square [12 df] = 419.41, $P < 0.001$).

Table 1: Numbers of individual species caught in each vegetation type and percent of total of each species which were males

Charaxes Species	M	B	C	% m
C. achaemenes		1		
C. brutus	2	2	2	16.7
C. blanda	1	2	103	28.3
C. candiope		1	6	42.9
C. castor	7	5	4	37.5
C. cithaeron	82	79	47	38.5
C. etesipe			1	
C. guderiana	1	38		35.9
C. lasti	6	32	3	41.5
C. protoclea	9	9		22.2
C. jahlusa	152	49	93	43.5
C. varenes	6	22	7	57.1
C. violetta	1			
C. zoolina	3	14	49	51.5

Key: M=Mixed deciduous woodland, B=*Brachystegia* woodland, C=*Cynometra* forest and thicket, m=males.

Discussion

From the Chi-squared contingency test (species caught in very low numbers were not included in the test), it can be seen that there are indeed, as the results in table 1 suggest, highly significant differences in the distribution of *Charaxes* butterflies between the three vegetation types in the forest. Most marked are the positive associations of *C. b. kenyae* with *Cynometra* vegetation and *C. g. rabaiensis* and *C. l. lasti* with the *Brachystegia* woodland. Larsen (1991) writes that *C. b. kenyae* is local and not normally numerous, usually found in the *Brachystegia* woodland. We found that the butterfly was highly restricted to the *Cynometra* vegetation, and that within this area it was the most prevalent of all the *Charaxes* species caught (table 1). Van Someren (1970) writes that the female oviposits on *Dalbergia* (Papilionaceae) and *Brachystegia* sp. We did not find any one female of those caught willing to oviposit on either *Dalbergia melanoxylon* (Papilionaceae) or *B. speciformis*. Furthermore the butterflies' almost complete restriction to the *Cynometra* vegetation makes *B. speciformis*, the only *Brachystegia* species to occur in Kenya (Beentje, 1994), an unlikely foodplant. Further efforts using *C. webberi* (Caesalpiniaceae) have also been unsuccessful. However one egg was laid on a *Memecylon* sp (Melastomataceae).

Charaxes g. rabaiensis is an inhabitant of *Brachystegia* woodland. Henning (1989) and Van Someren (1970) record the larval foodplants as *Brachystegia* spp., in addition Henning also notes *Julbernardia globiflora* (Caesalpiniaceae), *Amblygonocarpus andongensis* (Mimosaceae) and *D. melanoxylon*. *B. speciformis* is recorded by Van Someren and Rogers (1931) as a larval foodplant. However, our attempts to get the butterfly to lay on *B. speciformis* were unsuccessful.

The only other of the recorded foodplants to occur in Kenya is *D. melanoxylon*, and is present in the forest (Beentje, 1994), but we have not substantiated it as a larval foodplant ourselves. Other than this, *J. magnistipulata*

is a possibility. Its dominance within the *Brachystegia* woodland could explain the butterfly's restriction to the area. Interestingly, however, we did find that *C. g. rabaiensis* will lay readily on *C. webberi* in captivity, but the newly hatched larvae will not feed on the plant.

Charaxes l. lasti is similar to *C. g. rabaiensis* in that it is also almost completely restricted to the *Brachystegia* woodland. Henning (1989) notes the larval foodplants as *J. magnistipulata*, *Paramacrolobium coeruleum* (Caesalpiniaceae) and *A. quanzensis*. Van Someren (1970) writes that females will lay readily on *A. quanzensis* in captivity, but that the newly hatched larvae will not feed on the plant. We have also found this phenomenon. Both *Julbernardia* and *Paramacrolobium* as larval foodplants would explain the butterfly's restriction to the *Brachystegia* woodland, both species being found there (Beentje, 1994), and *J. magnistipulata* being a dominant plant in the area (Gordon, 1993).

We found *C. zoolina zoolina* to have a positive association with the *Cynometra* vegetation. Henning (1989) records the butterfly's larval foodplants as *Acacia* spp. and *Entada* spp. (Mimosaceae). Of the species noted only *Acacia brevispica* (Mimosaceae) and *A. pentagona* (Mimosaceae) occur in Kenya (Beentje, 1994). Van Someren (1974) in his revisional notes on African *Charaxes* does not mention the larval foodplants, but according to Van Someren and Rogers (1925–1929) in their work on the butterflies of Kenya and Uganda, the larval foodplant is *Acacia penatta* (Mimosaceae), described as a thorny creeper with close-set curved spines. Beentje (1994) does not record this plant as occurring in Kenya, but it is likely that the plant has been reclassified. *A. pentagona* does fit *A. penatta*'s description, which within the forest seems to be more associated with the *Cynometra* vegetation than elsewhere and so as *C. zoolina*'s foodplant could explain its distribution within the forest. Of the *Entada* species noted by Henning, namely *E. abyssinica* and *E. spicata*, only *E. abyssinica* occurs in Kenya (Beentje, 1994). However, it is not recorded as occurring in the Arabuko-Sokoke Forest.

Haplocoelum foliolosum (Sapindaceae) is recorded as the known larval foodplant of *C. jahlusa kenyensis*. However, this plant is not recorded as being present at the coast and so may only be applicable as a limiting factor in the butterfly's distribution at Kibwezi, where the species has been studied (Henning, 1989). Larsen (1991) also notes records from *Acacia*, *Dalbergia* and *Grewia* (Tiliaceae), but states that these need substantiation. The butterfly is well distributed in the forest with a marked preference for the mixed deciduous woodland and if the larval foodplant is the limiting factor, then this is likely to be a plant which is abundant in the mixed deciduous forest.

The distribution of *C. cithaeron cithaeron* in the forest may be explained, not surprisingly, by the distribution of its known foodplant at the coast, *Afzelia quanzensis* (Caesalpiniaceae), (Henning, 1989; Larsen, 1991). As the prevalence of the tree varies between the different vegetation types, so does the prevalence of the butterfly, being highest in the mixed deciduous forest and lowest in the *Cynometra* vegetation.

Due to the transport difficulties, we were restricted as to how much of the forest we could work in. The number of butterfly traps available to us also limited our range. As a consequence, although we managed to cover areas which included all three vegetation types, we still left a very large area of forest uncovered. Therefore our findings may not reflect the species distribution of *Charaxes* butterflies in the forest as a whole.

Furthermore, the highly seasonal nature of the forest as regards its butterfly populations throughout the year means that our findings may only hold true for that particular time of year when our study was carried out. Further studies, more extensive, but of a similar nature, would be needed to investigate this.

The findings concerning *C. b. kenyae* may reflect a high degree of seasonality in the species. So little seems to be known about the biology and natural history of this butterfly that further studies are needed on this species alone.

The results presented here also suggest that it is the larval foodplant of the butterflies which in each case is the limiting factor to their various distributions within the Arabuko-Sokoke Forest. However, there may be other contributing factors not considered in this report.

Conclusions

The following patterns were detected:

- *Charaxes blanda kenyae* was highly restricted to the *Cynometra* vegetation.. One egg was obtained from a female in captivity on a *Memecylon* sp (Melastomataceae).
- *Charaxes guderiana rabaiensis* was highly restricted to the *Brachystegia* woodland. Females were found to lay readily on *Cynometra webberi* (Caesalpiniaceae), but the newly hatched larvae would not feed on the plant.
- *Charaxes lasti lasti* was largely restricted to the *Brachystegia* woodland.
- *Charaxes zoolina zoolina* was largely restricted to the *Cynometra* vegetation.
- *Charaxes jahlusa kenyensis* and *Charaxes cithaeron cithaeron* were more widely distributed throughout the forest than the other *Charaxes*. However, both showed positive associations with the mixed deciduous forest.

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BRIEF ASSOCIATIONS BETWEEN INDIAN HOUSE CROWS, *CORVUS SPLENDENS* AND ANTELOPES

Between November 1991 and March 1994, flocks of Indian House Crows, *Corvus splendens*, near Mombasa, Kenya were frequently seen attending semi-domesticated antelopes, such as oryx, *Oryx gazella callotis,* and eland, *Taurotragus oryx*. The birds were plucking engorged adult ticks. The behavioural response of antelopes to crow foraging was toleration or accommodation. The visits were relatively short and only once a day.

Introduction

The original range of the Indian House Crow lies on the Indian subcontinent, in tropical and subtropical lowlands (Cramp & Perrins *et al.*, 1994). Due to intentional introductions by man and self-introductions by ship, the Indian House Crow's distribution along the East African coast, Red Sea coast and Malay

Peninsula is expanding (Cramp & Perrins *et al.*, 1994, Ryall, 1994). They are now successful town scavengers on Mombasa Island (Ryall, 1992 b, 1994) and are the most complete example of adaptation by a corviid from natural to man-made habitats (Cramp & Perrins *et al.*, 1994). Many ornithologists in East Africa regard the Indian House Crow as a pest (Ryall 1992a). Its bad reputation results from its destructive effect on other bird populations. It is a well-known nest predator, raiding colonies of weavers (*Ploceus*) and Sunbirds (Nectariniidae). Furthermore, they frequently mob native corviids, such as the Pied Crow, *Corvus albus*, and other large birds (Ryall, 1991, 1992 a, b).

Methods and Results

Between November 1991 and March 1994 I was at Baobab Farm, near Mombasa in southeast Kenya, to do research on antelopes (Feuerriegel, 1995). At Baobab Farm semi-domesticated eland and oryx have been kept on marginal limestone and shale quarry sites for 17 years. The study areas were within the range of the Mombasa Island Indian House Crow population, approximately 10 km "as the crow flies." Flocks of crows were common in the study area during all months of my stay at the farm. Frequently in the early morning and late afternoon I observed crows foraging on free ranging eland and oryx. It is well-known that the Indian House Crow feeds on a wide range of food that includes parasites from large domestic stock (Cramp & Perrins *et al.*, 1994, Ryall, pers comm.). For one of the study sites Ryall (1991) described a loose relationship between livestock and crows where the birds followed grazing stock, such as sheep and goats, to catch disturbed locusts and other insects.

Since I spent most of my time observing oryx, I will focus on the encounters between the crows and this antelope. Between May, 1992, and May, 1993, (139 days and over 1250 hours of observation) I recorded 42 visits, 68 percent of which were in the morning hours and 38 percent of which were in the evening. The flock size was usually five to eight birds/visit, with a mean of only 3.4 birds actually taking ticks. Because some birds foraged more than one animal, a mean of 3.8 oryx were searched for ticks on each visit. The visits were generally not longer than eight minutes with an average of 4.8 min/visit. The birds left as fast as they arrived and never made more than one visit per day. Most of the time when the crows were attending them the oryx were grazing or stand idle. On only three occasions (7.1%) were the crows taking ticks while the antelopes were lying. The crows had no preference for a particular sex or age group of oryx. Oryx were intolerant if more than one bird tried to land on them. Crows generally defended their host against flock companions by performing a forward-threat display while calling (Cramp & Perrins, 1994).

I noticed that antelopes with a particularly high burden of ixodid ticks were not necessarily favoured. Therefore, it is assumed that the birds selected the antelopes by chance.

Obviously, the crows initiated the visits but the oryx played an active part too. As soon as an oryx noticed a crow landing on its back it remained still for a few seconds. In most cases the bird moved toward the oryx' rectal area and the oryx turned its head to face the visitor (fig. 1). Usually the oryx gave the crow access to its perineal area by lifting its tail. The crow took advantage of this situation and even used the tail as a perch. The rectal area is one of the few parts of the body which the oryx can not groom easily by themselves, hence, an observer could get the impression that the oryx, by lifting its tail, assisted the crow to reach this particular part of the body. Further tick infested areas, along the neck, the ears and the base of the horn were other preferred foraging areas. At no time was a crow allowed to search for ticks around the hosts eyes.

Around the farm area I never observed crows taking ectoparasites off domestic livestock. They never followed antelopes to catch disturbed grasshoppers, although occasionally small flocks of cattle egrets, *Bubulcus ibis*, did. In Kenya, Baobab Farm is well-known for crocodile farming. Occasionally a few crows visited these reptiles. The birds walked carefully around and even on top of the crocodiles while searching for food. However, more regularly the crows were found around the farm buildings and poultry pens.

Discussion

The encounter between crows and antelopes is another example of how adaptable and intelligent these commensals of man are. And although the antelopes were never attended by the real tick birds, *Buphagus africanus* and *B. erythrorhynchus,* since the two oxpecker species are rare within the coastal strip* (Hall & Moreau, 1970, Lewis & Pomeroy, 1989), they none-the-less, accepted and assisted the crows without hesitation.

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*Editors' note: It was suggested by one reviewer of the paper that this might be a nice example of "competitive release" If oxpeckers were present in numbers, the crows might not be doing this taking of ticks.

LESSER FLAMINGO BREEDING EVENT AT LAKE NATRON, 1995

The Eastern Africa population of the Lesser Flamingo (*Phoeniconaias minor*) is known to nest on the soda flats of Lake Natron in Tanzania where the breeding adults collect in hundreds of thousands and where the chicks fledge while feeding in the lagoons at the edges of the soda crust (*e.g.* Brown, 1973; Brown *et al.*, 1982). Details of the time, extent and size of breeding events of these flamingos at Lake Natron are few (Station Biologique de la Tour du Valat [SBTV], 1992) but are necessary for understanding the dynamics of this large population of wandering birds. The conservation needs of the millions of Lesser Flamingos that inhabit the soda lakes of the Rift Valleys in Ethiopia, Kenya, Uganda and Tanzania require knowledge of their population movements for feeding and breeding. These are ultimately related to their ability to breed and feed at Lake Natron as the only reliable nesting site in Eastern Africa.

Aerial survey of Lake Natron, November 1995

The information described here is based on a 85 minute aerial survey over the lake surface on 25 November, 1995. The flight originated in Nairobi and was carried out in a high-wing, single-engine aircraft (Cessna 172 RR) at around 2400 km above ground level—to avoid disturbing the birds at a lower height. The survey commenced at the northern end on the Kenya/Tanzania border near Shombole and covered the entire lake with groups of birds being located and noted in relation to the 1:250,000 base map used by Watson and Nimmo for the 1991 surveys (Appendix 1, SBTV, 1992). Numbers of Lesser Flamingos were estimated to the nearest one or five thousand (based on previous experience of this species in East Africa) and larger groups were circled by the aircraft until a reasonable population estimate was obtained.

The recently-abandoned nesting site was located and then observed at lower level and photographed. The position and extent of the nests were identified using a Trimble Scout GPS hand-held in the aircraft.

Aggregations of Lesser Flamingos

Birds were seen feeding in ten of the lagoons (all around the lake edge) formed where springs flow into the lake. The majority were in two very large groups: approximately 330,000 on the western shore, about 5 km north of Moinik village, and around 530,000 in the north-eastern extension of the southern lagoon, near the proliferation of springs. Both of these large aggregations of birds included many thousands of immature, white and grey, flightless flamingos—presumably the chicks from the recent nests.

The sum of the estimates was 1,057,000 birds, but this should be regarded as a measure of the order of magnitude of the population on Lake Natron, rather than as a number comparable with more accurate counts. This is not incompatible with the guesstimates of July 1994 which suggested a total Eastern African population of about four million Lesser Flamingos (Howard, 1995) and is very close to the estimate of 1,080,579 flamingos by Watson and Nimmo on 6 December 1991 (Appendix 1, SBTV, 1992). It was not possible to estimate separately the numbers of immature flamingos, only to record their presence.

Nests

The nests were found on the soda flats near the northern edge of the southern lagoon, in a

band at least 3 km long and often more than 100 nests deep. There were seven or eight more-or-less distinct groups of nests—often only two nest diameters apart from each other. Nests were of the expected circular shape, mounded from the darker (organic) mud which was distinguishable from the pale cream trona or the pink brine of other parts of the lake surface. It was possible to count every nest on some photographs (projected slides) with many thousands per frame. From this we judge that there were around a quarter of a million nests—or possibly more. No nests were seen in any other part of the lake.

Time of breeding in 1995

One of us (RO) had seen several dead Lesser Flamingo chicks on the eastern shore of Lake Natron during a ground visit on 25 October. These were approximately 30 cm long and so several weeks old. As the nests still retained their shape, we reckon that they had not experienced any significant rainfall since their occupation. From these indicators, and the presence of flightless birds nearby, we estimate that the nesting must have begun in late August or early September 1995. This timing is consistent with the description of Brown (1982).

Conclusions

This scant information is enough to record a significant breeding event for the Lesser Flamingo in Eastern Africa in 1995. It will be important to continue such observations and to increase their frequency, accuracy and detail if we are to be able to make sensible conservation recommendations for the Lesser Flamingo in this region. The activities of the African Waterfowl Census (see Dodman & Taylor, 1995) in estimating flamingo populations twice a year on some lakes should be related to feeding and breeding requirements and the movement of birds within the Rift Valleys. Monitoring of flamingos on the lakes of Tanzania (*e.g.* Woodworth, 1995) should also be related to movements and breeding whenever possible. The current research on interlake movements (see Githaiga, 1995) is based on work at three major feeding sites in Kenya but needs to be able to relate its findings to breeding events and movements as does an eventual plan for Lesser Flamingo conservation (*e.g.* Bennun, 1994; Howard, 1994).

Lake Natron will always be a special case with specific requirements for monitoring as the main breeding site for the Lesser Flamingo in the region. Its inaccessibility and the problems of seeing birds from the shore (over the shimmering trona) dictate that the main monitoring should be from the air. An aerial routine therefore needs to be developed to examine Lake Natron regularly—for both the feeding and breeding of flamingos. If the proposed soda ash plant at lake Natron is built, it will also be important to monitor its impacts on the flamingo nesting sites, the movement of chicks from nests to lagoons and the subsequent well-being of the immature birds until they can fly.

Acknowledgements

The aerial survey reported here was carried out as part of a study commissioned by the National Chemical Industries (NCI), Dar es Salaam. The authors are grateful to NCI for assistance in obtaining the requisite flight clearance from the Tanzanian Directorate of Civil Aviation.

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G.W. Howard, Eastern Africa Regional Office of IUCN, P.O. Box 68200, Nairobi, Kenya; R. Olivier, Ecosystems Consultants, African Liaison Office, P.O. Box 68200, Nairobi, Kenya.

Short Communications

CULCASIA FALCIFOLIA ENGL. NEW FOR KILIMANJARO AREA

The genus *Culcasia* P. Beauv. (Araceae) has about 20 species, endemic to tropical Africa, with only two species occurring in East Africa. These two species, *Culcasia falcifolia* Engl. and *C. orientalis* Mayo, have previously been known as *C. scandens* P. Beauv., a name that has a confused application (Mayo, S.J. 1985. Araceae. In R.M. Polhill (Ed.), *Flora of Tropical East Africa*. Balkema, Rotterdam & Brookfield).

During a field trip in March 1996 I found *Culcasia falcifolia* climbing trees at Kikafu river above Nrwaa, near Machame on the south-east side of Kilimanjaro, at 1800 m a.s.l. The habitat was a gorge forest with *Turraea robusta, Xymalos monospora, Macaranga kilimandscharica, Afrocrania volkensii, Prunus africana, Ilex mitis, Cyathea manniana, Schefflera volkensii* and *Albizia gummifera* in the tree layer. Due to the high precipitation of over 2000 ml per year the forest was rich in ferns both in the undergrowth and the epiphytic stratum. Very apparent epiphytes were *Drynaria volkensii, Pleopeltis excavata, Asplenium sandersonii, Asplenium smedsii, Asplenium hypomelas, Hymenophyllum kuhnii* and *Loxogramme lanceolata*. The undergrowth consisted mainly of *Blechnum attenuatum, Asplenium elliottii* and *Cyclosorus madagascariensis*. Also the orchid species *Calanthe sylvatica* gave a colourful aspect to the vegetation unit.

Culcasia falcifolia is very widespread in tropical Africa, and in Tanzania it is recorded from the flora regions T1, 3, 4, 6 and 7 (Mayo, 1985). Mount Kilimanjaro is in the flora region T2, and so this latest gathering is a new distribution record. Vouchers (*Hemp 1038*) have been deposited in the East African Herbarium, Nairobi (EA), and the Berlin Botanical Museum Herbarium, Germany (B).

Andreas Hemp, Lehrstuhl für Pflanzenökologie und Systematik, Universität Bayreuth, 95440 Bayreuth, Germany.

GRAUER'S RUSH WARBLER *BRADYPTERUS GRAUERI*

The East African Wild Life Society-Uganda Branch is supporting a project looking at Grauer's Rush Warble, *Bradypterus*. One may ask why it is important or even necessary to look at such a small brown bird when there are numerous such birds, confusing even the keenest bird-watchers? The answer lies in its conservation importance. Grauer's Rush Warbler is listed as Vulnerable in Birds to Watch 2. This means that there is a reasonable chance of it going extinct in the foreseeable future and therefore needs serious conservation attention.

Grauer's Rush Warbler is found only in a few highland swamps within forests in eastern Zaire, southwestern Uganda, Rwanda and northern Burundi. According to the Red Data Book, the species is normally common wherever it occurs. The problem is that most of the highland swamps are very small. The single most important site for the species is Rugezi swamp in Rwanda which covers about 8,000 ha. Other sites where the species is found are rather small and the total occupied range is estimated at less than 20,000 ha.

The threats to the Grauer's Rush Warbler are mainly habitat loss. The main Rwanda sites are threatened with drainage for tea growing, except Kahuzi-Biege National Park. The main site in Burundi, the Kamiranzoju marsh, is thankfully now under protection, but was seriously threatened by gold miners.

The remaining important sites are in Uganda of which Bwindi Impenetrable National Park (BINP) and Mgahinga Gorilla National Park are well protected, but others such as Mchuya are not.

If all this is known about the species, then why is it important to do more research? The Grauer's Rush Warbler is a very poorly known species. Until recently, one could not find a field guide that adequately described it. Its breeding biology is not known. Few people know the juvenile plumage, the nests, habitat characteristics affecting placement of nests nor breeding success and factors affecting it. Any conservation efforts designed for this species would definitely be handicapped by lack of such information.

On 3 November 1995, Paul Mwambu, a post-graduate student at Makerere University, and I set out to BINP in search of the Grauer's Rush Warbler. The objectives of the trip were to get a close look at the birds and decide on an acceptable method for assessing their abundance.

BINP is one of the newly created forested National Parks in Uganda characterised by a very rich biodiversity. It has 336 bird species listed, of which seven, including the Grauer's Rush Warbler, are listed in the Red Data Book. Twenty-one of these species have a restricted range confined to the afromontane region of the Albertine Rift. On a national level, BINP supports seven species not recorded anywhere else in Uganda. Apart from birds, BINP supports possibly a third of the world's mountain gorilla population.

We started the search at Mubwindi swamp, a narrow but long stretch of swamp not more than 100 m wide in most places and set up camp near the swamp and settled for the night. This consisted of a tarpaulin supported by poles inclined at an angle of about 60°, rather than the usual tent which tends to become damp and cold in this climate.

The next day we braved biting midges and set up 36 metres of mist net across the swamp. The nets were opened at 7:00 am and we closed them by 9:00 am having achieved our first objective—to have a good look at a Grauer's Rush Warbler. In the space of two hours, we had caught six birds of which three were Grauer's Rush Warblers. This supports the published information that these birds are common to abundant wherever they occur.

For the next several months, Paul will assess the presence of this species in other swamps both within and outside the BINP. In addition he will assess the abundance and

seasonality of the species and possibly document their breeding habits. His findings, it is hoped, will form a basis for the proper conservation of this little known species.

Julius Arinaitwe, Makerere University. Box7062, Kampala, Uganda

Book Reviews

Collins illustrated checklist: Birds of Eastern Africa by Ber van Perlo. ISBN 0 00 2199378. Pp 301. Harper Collins, Hong Kong. 1995. Price K.Sh. 895 to EANHS members through the EANHS office.

This paperback states that it is an illustrated checklist of all the birds of Kenya, Tanzania, Uganda, Ethiopia, Somalia and Socotra Island and that this includes migrants. An illustrated checklist is a new concept as far as we are aware. And this is not the end of the claims made for the book. On the back it is stated that this is "The only field guide to illustrate every bird species..." It is therefore as a field guide that the book has to be assessed, particularly as certain advertisements talk of it replacing John Williams *Field Guide to the Birds of East Africa.*

The book is of field guide size (19 cm x 13 cm) with illustrations opposite the scanty text which rarely runs to three lines on a species. In the text there is no description of the bird, and one is left to the tiny paintings (sometimes over 30 birds to a page). The habitat is very sketchily described. In some groups which we have reviewed the habitat description is so vague as not to be of assistance. This applies particularly to the cisticolas who are very habitat-specific—admittedly a hard group to deal with.

Distribution is dealt with only on tiny maps of Eastern Africa (32 mm x 14 mm) at the back of the book. These really are not big enough for any meaningful attempt to decide where a bird can be found. A single cross can cover most of the southern part of Uganda for instance.

A most serious criticism is that the author has changed many common names without any justification as far as we can see. Common names are just that—the names the birds are known by. Everywhere from Kenya to East Asia *Terpsiphone* is the paradise flycatcher and no one ever calls it a monarch, which to us means a famous migratory American butterfly, *Danaus plexippus.* Plovers of the genus *Vannellus* become lapwings for no good reason. Rock chats of the genus *Cercomela* become mere chats and this is seriously misleading since their habitats are universally rocky. There is also no justification for changing crake to flufftail nor canary to serin. Finally the cisticolas: the tinkling cisticola is renamed Le Vaillant's cisticola (he did not even describe it) and the Tabora cisticola Neddicky cisticola, both South African names never in use here.

The conclusion must be that this is not a replacement for Williams or Guggisberg as a field guide, however useful it is to have the migrants pictured.

Yvonne Malcome-Coe, P.O. Box 48504, Nairobi, Peter Le Pelly, P.O. Box 30333, Nairobi

A new bird book on the scene always excites my interest. Described as an "illustrated checklist, every species illustrated" I felt I must immediately rush out and buy ***Collins illustrated checklist: Birds of Eastern Africa*** by Ber van Perlo and try it out on my next monthly bird walk. This I duly did. Most of my birders do not want to invest in expensive volumes but do like to see pictures of the birds they have seen. This book is extremely affordable and very portable, unlike most of

the more prestigious tomes. Illustrations proved highly acceptable (though in some cases not exactly true to colour) and recognisable to my birders (they sometimes argue with me about my identifications when they see the Williams' pictures). Common names of species provoked some "discussion" and I can see that this could be a problem to the amateur birder who does not have access to another guide. Information is scanty but as it is a "checklist" this is to be expected, maps for distribution are a help in persuading my birders that they have not seen a great blue turaco in the Shimba Hills. On the whole a very worthwhile publication, very good value for money, very usable in the field as I proved and at last I can take my birders down to the beach to see all the little wading jobs and not have to carry two books!

Marlene Reid, Box 80429, Mombasa.

Editors note: While we agree with the criticisms mentioned above, both editors have taken this book to the field and find it extremely useful and highly portable, making it necessary to carry only one book rather than the normal two or three. Having all birds illustrated gives an immediate impression of those birds easily confused with others, something which has not been available before. As a result, if good notes are taken on birds not immediately identifiable (which at any rate should be regular practice),even keen beginners should be able to track down most of the birds they see.

Society News

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Articles and Notes

SWAHILI ETHNOHERPETOLOGY: NOTES FROM CENTRAL UNGUJA

The following notes are intended to supplement the ethnoherpetological data included in R.H.W. Pakenham's study (1983) of the reptiles and amphibians of Zanzibar, in particular the Swahili names of snakes and other reptiles he recorded for Unguja (formerly Zanzibar) island.

The notes are based upon information provided by a young man (aged in his mid-twenties) at Mseweni in central Unguja on 24 May 1995. The hamlet of Mseweni (or Ndijani Mseweni, as it is often called) lies in the centre of the island, south of the main Zanzibar-Chwaka road and less than 10 km north-west of the Jozani Forest. This is currently one of the most rapidly developing agricultural areas of Unguja: in recent years many farmers have moved from the nearby plantation areas to settle and cultivate a wide variety of crops (including orange trees) on the semi-coral rag *uwanda* land which was formerly used for shifting cultivation and largely covered with bush. Nonetheless, some patches of forest remain in the Ndijani area, and the large "rice valley" of Cheju, just to the south of Mseweni, adds to the diversity of local habitats.

My informant, like other inhabitants of Mseweni, spoke the standard Unguja dialect of Swahili, though some influence from the southern and eastern dialects of the island is apparent in the local terminologies for flora and fauna. The ethnoherpetological information presented here was recorded in the course of an informal discussion about the fauna of the Mseweni area and only later (sometime after my stay in Mseweni) compared with the data provided by Pakenham. While this is not an ideal procedure for research of this kind, it was the only one which time and other tasks allowed. Ideally I would also have interviewed other, and perhaps more knowledgeable, informants. However, given the general paucity of published material of this kind—Pakenham's careful recording of local names being the exception rather than the rule—I hope that the following will be of some use, if only to encourage more thorough research by others.

Snakes

Pakenham recognised the presence of 23 species of snake on Unguja, though it is difficult to tell from his account how many of these might be found in the Mseweni area. In addition to the general term for snakes my informant recalled seven named varieties and also referred to an eighth which he was unable to put a name to. These are listed below, together with his observations and my own comments. In this and subsequent sections I have mostly followed the nomenclature in Pakenham (1983), adding his subspecies names in parenthesis (assuming that these in particular are liable to change). Alternative English names are taken from Branch (1988).

nyoka: the general term for snake and any member of the suborder Serpentes

chatu: this is the common Swahili name for the African rock python, *Python sebae*, also recorded by Pakenham. My informant described this as the only snake without a poisonous bite, although it can swallow chickens, goats, calves and even humans. He also stated that it can live in a hole underground for a whole year, only coming out on just one day to feed. Reports from other farmers in the area

indicate that pythons are most often encountered in the well-watered Cheju valley, where irrigated and rain-fed rice are cultivated.

ukuti: this was described as a relatively small green snake. Pakenham gives *nyoka-kuti* and *nyoka-ukuti* as Unguja names for the spotted bush (or wood) snake, *Philothamnus semivariegatus* (ssp *semivariegatus*). In the *Standard Swahili Dictionary* (Johnson, 1939) it is suggested that this name for the snake is derived from the Swahili term for the side frond of a coconut leaf (also *ukuti*; plural *kuti*): when on the tree these are similar in colour and length to the snake (or at least green variants thereof).

mtunguu: described as a larger version of the *ukuti*, yellow or bright green in colour. Pakenham was given this name at Muyuni, in southern Unguja, for average-sized specimens of the green mamba, *Dendroaspis angusticeps*—the largest ones were called *shangauka*. Given the suggested botanical derivation of the name *ukuti*, an analogous etymology can be posited for *mtunguu*: this also being the local name of the wild cardamom, *Afromomum angustifolium*, which has long green stems similar in length to the green mamba (for a description and illustration of this plant, which is common in the Jozani Forest, see Williams, 1949).

peku (plural **mapeku**): according to my informant a grey-coloured snake which is particularly fond of (hen's) eggs and is most commonly found in the 'home garden' areas (*viamboni*), where there are many tall plantation trees. At Jambiani, in south-east Unguja, Pakenham was given this as the name of the boomslang, *Dispholidus typus*, a snake which may vary considerably in colour.

jangasa, or **jangasa-kima**: described as a large version of *peku*, which is black in colour and is found in the larger forests and areas of thick bush. My informant said that the name *jangasa-kima* refers to the fact that they are apt to attack monkeys by jumping up or flying through the air at them: *kima* is the Unguja name for the white-throated guenon or Sykes' monkey, *Cercopithecus mitis* (ssp *albogularis*), which is very common on the island (Pakenham, 1984). Pakenham did not record these names, but at Chwaka and Muyuni was told about a big black tree snake called *nyoka-kima*, reputed to be very aggressive, and which he suggested might be identified as either the green mamba or boomslang. Given the similarity of names and descriptions, there seems little doubt that *jangasa-kima* and *nyoka-kima* have the same referent(s).

mkufu, or **nyoka-mkufu**: this snake, said to be very poisonous and therefore dangerous, was described as having black and white stripes on its body like a *mjusi* (a gecko or skink, see below). The Swahili name presumably refers to this pattern and coloration, *mkufu* being a metal chain. Pakenham does not record this name. It appears, however, in cognate form in the Rabai dialect of Mijikenda, spoken in the hinterland of Mombasa on the Kenya coast (Mijikenda and Swahili being closely related languages). The Rabai *nyoka-mukufu* is glossed as 'the chain snake', and described as having a body like an iron chain (Krapf & Rebmann, 1887). In the absence of more precise information it is difficult to say which species either the Unguja or the Rabai name might refer to.

kobra: this name was used for a snake which my informant described as black in colour, possessing a hood and capable of standing up. He did not know of any other name for this snake nor, apparently, was aware that this was a loan-word from English. Pakenham records the presence of two species of cobra on Unguja, the forest or black-lipped cobra, *Naja melanoleuca*, and the Mozambique spitting cobra, *Naja mossambica* ssp *mossambica*. He does not, however, give a Swahili name for

them. The lack of an indigenous name—or at least one that was known to our informants—may well be a function of the fact that these snakes are comparatively rare on the island.

[unnamed]: another snake, which my informant had seen once in a nearby forest, was described as being long and thin and having a mixed pattern of different colours, including khaki and black. He did not know a Swahili name for this snake, which did not fit into any of the above categories. Again, without more precise information, it is difficult to suggest an identification.

The above list is interesting for a number of reasons. It includes more than half of the Unguja snake names recorded by Pakenham, and adds two which are not: *jangasa* or *jangasa-kima* (apparently equivalent to his *nyoka-kima*) and *nyoka-mkufu*. It does not include the following:

- *nyoka-mwale*, given by Pakenham for the (Northern) stripe-bellied sand snake, *Psammophis subtaeniatus* (ssp *sudanensis*);
- *mtumia-kuwili* (literally 'the one that goes both ways', because of the superficial similarity between head and tail), applied to the four species of blind snake, family Typhlopidae;
- *kipilili*, recorded for the snouted night adder, *Causus defilippi*, which is apparently quite rare.

The apparent absence of names in either of our lists for some of the quite common snakes of Unguja, such as the brown or common house snake, *Lamprophis (Boaedon) fuliginosus*, suggests that they may be subsumed under some of the same terms. Further research on the referents of the Swahili terms is required to establish this for certain.

There is evidently a bias in Unguja Swahili taxonomy towards more specific identification of the snakes which are dangerous to people and their livestock. All of the snakes which my informant named were considered by him to be poisonous or (in the case of the python) harmful in some other way. Although the spotted bush snake is not poisonous, its Swahili name, *ukuti*, is probably also extended to immature or small green mambas, the larger specimens of which are called *mtunguu*. Indeed my informant stated his belief that *ukuti* and *mtunguu* are names for the same snake in different stages of growth, and from this point of view it is quite reasonable that both of them should be feared. Likewise he considered *peku* (which Pakenham was given as a name for the boomslang) and *jangasa-kima* to be size variants of the same snake, the former growing into the latter, and it is quite likely that one or both of these names also refer to more than one zoological species.

From a linguistic point of view it is interesting to note that many of the names of snakes are descriptive in some way, especially of the snake's colour and/or appearance. Three of the Unguja names appear to be derived from the names for common plants or parts thereof: *ukuti* from coconut palm (*Cocos nucifera*) fronds, *mtunguu* from the wild cardamom and Pakenham's *nyoka-mwale* (the stripe-bellied sand snake) from the raffia palm (*Raphia farinifera*), called *mwale* in Unguja Swahili.

Lizards

Pakenham admitted 12 species of lizard (including five geckos, four skinks and one chameleon) to his list of those normally occurring on Unguja. My informant provided the following five Swahili names:

mjusi: this was the only name for skinks and geckos which my informant knew, though he recognised three different kinds of *mjusi*, which he said he could distinguish by colour but not by name. A young man from Bumbwini in northern Unguja, joining in our conversation, volunteered the additional names *mjusi-kafiri* and *gonda*. As Pakenham notes,

mjusi-kafiri (the 'pagan' *mjusi*), refers to the reputedly more handsome and devout skinks, family Scincidae. Pakenham records *gonda* as a generic name for *Mabuya maculilabris*, the speckled-lipped skink, and *M. striata*, the striped or common two-striped skink. He reports that the former is also called *kigorong'ondwa* and *gonda-mjusi* at Muyuni in southern Unguja, but did not record any other Swahili names for skinks or geckos on the island.

kenge: described as a large lizard which grows up to one *pima* in total length, the distance between a man's outstretched arms. This is the common Swahili name for the Nile monitor, *Varanus niloticus* (ssp *niloticus*), also recorded by Pakenham. While working in Mseweni I saw a dead juvenile on a path close to the house in which I was staying, this being the midst of the area of dispersed settlement and orange cultivation.

guruguru: this was described as similar to *kenge*, the Nile monitor, but much shorter in length, around one foot. Pakenham records this as the name of the great or rough-scaled plated lizard, *Gerrhosaurus major* (ssp *major*, the Zanzibar great plated lizard), which is usually 30–40 cm in length and the only lizard on Unguja which fits the description given. In the Makunduchi dialect of southern Unguja it is called by the cognate term *guuguu* (Chum, 1994). The distinctive size of this species, and likewise that of the larger Nile monitor, presumably explains why they are clearly distinguished from smaller lizards by name.

kimalele or **kimbaumbau**: these were given as the local names for chameleons, though my informant was not sure whether they referred to different varieties or were alternative names for a single kind of chameleon. The scientific classification of chameleons on Unguja is similarly uncertain. Pakenham notes that although most authorities recognise a single species, *Chamaeleo dilepis*, the flap-necked chameleon, some distinguish between two subspecies (*C. d. dilepis* and *C. d. quilensis*), while one author describes the second of these as a full species (*C. quilensis*). Pakenham records that he heard both of these Swahili names in southern Unguja, and they also appear in Chum's vocabulary of the Makunduchi dialect (1994); otherwise the most widespread name for chameleons on the island was and is *kinyonga*.

My informant noted that some chameleons have a 'crest' (a noticeable feature of the flap-necked chameleon) and speculated that the presence or absence of this may distinguish between males and females. He also described chameleon saliva as being poisonous and liable to cause *ukoma*, leprosy, in humans who are unfortunate enough to come into contact with it. It is not clear how this belief, which has widespread correlates in Africa, might have arisen: although flap-necked chameleons are known to bite, there is no scientific evidence for their saliva being harmful in any way.

Other reptiles and amphibians

For the sake of completeness it can be noted that there are no indigenous land tortoises or terrapins on Unguja island. Mseweni lies in the centre of the island and its inhabitants do not fish in the sea or are otherwise familiar with the different species of turtle which frequent Unguja's coasts. I did, however, also ask about amphibians. Pakenham recognised 22 species of frog and toad as occurring on Unguja (one not confirmed) but my informant only knew one Swahili name for these, *chura* (plural *vyura*), although he recognised that there was some difference between the larger terrestrial varieties and the smaller ones which climb trees.

Conclusion

Although Swahili is the best-known and most widely spoken language in East

Africa, comparatively little research has been undertaken on Swahili ethnozoology (including ethnoherpetology). Published dictionaries and compilations like that by Maimu (1982) generally fail to record the regional and local dialect variations which are an essential feature of Swahili ethnography. Pakenham's work on Zanzibar forms an important exception, though, as above notes indicate, there is still a lot of work remaining to be done. I hope that these notes will encourage others to take up this task.

Acknowledgements
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BIRD WATCHING THRILLS IN THE RIFT VALLEY OF KENYA

My wife and I had the good fortune to live in the Rift Valley of Kenya for 35 years. Both our children shared our interest (almost devotion) to ranching and wildlife in every form and shape. Most of the time we lived on a spur of the Eburru Mountain, directly opposite Kipipiri Mountain in the Naivasha District. Scenically, the area is stupendous; both mountains top 9000 feet and have thick cedar and podo forest with a capping of bamboo. The volcanic crater of Longonot and the soda lakes Nakuru and Elementaita set the scene; all easily visible within a 30 mile radius.

So much for the setting. Our property ran from 1920 to 2668 m (the rainfall

was around 635 mm per year) and could be described as *Themeda* grassland and bush with volcanic rock. The vegetaton was not very palatable but we survived and it was fun developing the farm. Apart from a wide range of game animals, particularly buffalo and leopard, the bird life was impressive in that we finally identified over 240 species.

Perhaps the most consistent sight, or sound, was the nightly migration of Lesser Flamingo in enormous flocks strung out over miles flying down from their feeding ground in Lake Nakuru to their breeding ground in Lake Natron about 225 km south, and sometimes apparently back again next morning! We never discovered why an occasional bird fell out of the sky with a resounding 'thump', but we would find them in the morning without any sign of having been attacked by birds of prey. Many of these latter patrolled our 'air-space', particularly Martial and Tawny Eagle and Bateleur.

During the period 1970–74 literally thousands of Great White Pelican would pass within a hundred feet of our house top in magnificent "V" formation, seldom a wing flap but a gentle wind roar. As one mid-morning flight skimmed over the farm my son and I watched a Martial Eagle dive from several hundred feet above them and amazingly knocked two Pelicans out of the sky in one stoop! We retrieved these unfortunates before the Martial landed and found they each had a small gash on the nape of the neck. The reason for this unusual invasion of Pelican is example of the hand of man manipulating nature. Lake Nakuru is a soda lake and prior to 1960, when Sir Peter Scott officially opened it as a National Park, did not contain any fish. It was the preserve of the Flamingo, Greater and Lesser, and periodically dried up. *Tilapia grahamii* were introduced at this time from Lake Magadi because a new water-borne sewage system had been installed in the Township and the effluent boosted the water levels in the lake. Ten years later the bird life at Nakuru changed to include Cormorant, Fish Eagle, Pied Kingfisher and Pelican (Great White and Pink-backed). Exactly why they made the daily trip to Lake Naivasha 80 km south and back again in the evening mystified us but also gave great pleasure in watching them use thermals as the day warmed up to reach 'operating altitude' and then glide for miles, with what looked like a knowing smile on that huge beak!

Other highlights over the years included a regular lighting of up to six Osprey circling over a small crater lake near Naivasha main lake. This I think would be uncommon anywhere in the world. Similarly, to have three pairs of Verreaux's Eagle Owl breeding in the yellow barked fever trees was fascinating. They could be induced to converse if one imitated their grunt—although my efforts probably sounded rather like an Anglo-Saxon hippo.

Our resident augur buzzards kept us entertained all the years on Eburru and spent most of their time catching the mole rats in the pastures. Although my wife reared an orphan in the chicken run until it flew away, they never attacked domestic fowl. The tawny eagles would swoop on any buzzard with a mole in its talons and try to make it drop the mole before reaching cover; a bit of banditry which seemed unfair to us as there was plenty of small game to occupy the tawnies instead of 'sponging' off the noble buzzards! However, such is the life in the raw I suppose.

A frequent visitor was the Lammergeyer or Bearded Vulture. These bred on some inland cliffs about 40 km away. We observed these unusual birds dropping shank bones into a particular outcrop of rock many times. The bone was usually a sheep's or an impala's leg bone. They flew into the wind and took some time in apparently 'aiming' and then dropped acrobatically with great speed—again to foist off the ever present tawnies who would have observed the

whole procedure from a great height! A gangster, surely?

The same cliffs were used by Rüppell's Griffon Vultures for breeding and they were our commonest vulture. In 1961 whilst collecting up sheep corpses after an attack by wild dogs, I noticed one vulture needing a long run to take off and finally flapping into a single tree about 100 m away. He looked odd and using binoculars I saw perfectly clearly a native-made arrow had entered his breast and was sticking out about eight inches between his shoulder blades! The tip was intact and the feathered ferule was visible between his legs. This must have been a great encumbrance to the bird, but there was no sign of a fresh wound so I assume the arrow must have missed all the vitals and somehow he had accommodated his flight, landings and take-offs accordingly. Truly, if one watches carefully, wildlife puts on a fascinating show.

During 1978–84 we lived in a cottage on the shore of Lake Naivasha and enjoyed the 400 odd bird species living there. Fish Eagle were a major feature and it was calculated that there was a pair every half mile round the lake side! Certainly their call was a permanent back-drop to all else that was going on. For several successive evenings in August 1980 we witnessed what I understand was a unique gathering of 37 immature fish eagles which could be seen homing in on our specific strip of fore-shore from a long way out. The attraction seemed to be a grove of fig and fever trees about 200 yd by 30 yd on a low cliff above the papyrus. About half of the birds were one year, the rest two years old. This performance was repeated for about a week and then ceased. There was no squabbling or calling or activity of any sort once the birds were roosted. Local ornithologists could not explain this phenomenon and to our knowledge, it has not been reported again.

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UPDATE OF THE RARE (SOKOKE) BUSHY-TAILED MONGOOSE, *BDEOGALE CRASSICAUDA* CF *OMNIVORA* AT THE SHIMBA HILLS, DIANI BEACH AND TIWI

Five subspecies of the rare four-toed mongoose *Bdeogale crassicauda* have been described in Eastern Africa (Taylor, 1986; 1987).

The uncommon subspecies of *B. c. omnivora* Heller, 1913, known as the Sokoke bushy-tailed mongoose, has until recently only been suspected as occurring in the Shimba Hills National Reserve, south of Mombasa, Kenya (Schreiber *et al.* 1989). Pictures of a live specimen of a bushy-tailed mongoose in its natural environment in the Shimba Hills National Reserve were taken in June 1993 (fig. 1; Engel & Van Rompaey, 1995). The animal was foraging on either queen termites or male driver ants (*Dorylus* sp.) along a cratered, rough road between a large open grassland area (Marere circuit with bush and very small islands of forest) and a pine plantation (*Pinus caribaea*), approximately 300 m from the Longomwagandi Forest. This previously exploited indigenous relict forest still has one of the highest plant diversities along the East African coast.

After a few days of rain, insects abounded and even the silvery-cheeked hornbills (*Bycanistes brevis*) did not leave the forest area that evening, as is usual, but stayed hawking insects in the air at sunset. The mongoose was spotted in car headlights at about 18:50 h. It was walking up and down the road which was full of crawling, wingless insects (approximately one per m^2). The animal was walking and sometimes rushing 1–2 meters to catch the insects. Although the

car engine was turned off and on several times so that the animal could be followed and photographed about 20 times at a distance of between 6 and 20 meters, the mongoose was undisturbed, and continued to forage for about 20 minutes before disappearing into the darkness.

Description

Heller (1913) described the holotype of *B. c. omnivora* from Mazeras as resembling *B. c. crassicauda* in its size and proportions, but with darker tail and feet (black rather than seal-brown), and a lighter body colour, due to the rarity of black-tipped hairs (the buffy underfur predominates, giving the coat a grizzled effect). Head and body: 420 mm, tail: 245 mm, hindfoot: 81 mm, and ear: 34 mm. Body weight averages 1.5 - 2 kg.

The bushy-tailed mongoose from the Shimba Hills National Reserve had a very bushy, blackish tail, and short, black-haired legs. The rest of the body was more dark to light brownish, and not dark black. The eyes reflected silvery-white in the spotlight (fig. 1).

The other subspecies can be either distinguished by their geographical distribution (compare fig. 2) or on biometrical characteristics and rather sophisticated descriptions (Sale & Taylor, 1970). According to Taylor (1986) *B. c. crassicauda* and *B. c. nigrescens* are dark chocolate-brown in appearance, while *B. c. omnivora* is yellowish-brown.

The three male specimens known from Sokoke (now in the National Museum of Kenya, Nairobi) are smaller and paler (legs), and their tails are less bushy. The tail of the Shimba Hills specimen is longer (tail length is relatively closer to the head and body length) than previously described (compare size relation in fig. 1 with descriptions given in Taylor 1987). Obvious differences in appearance might merely reflect intraspecific variation; lacking statistically based testable data makes separation on (sub-) species level difficult. On the other hand, phenotypically different, isolated and non-interbreeding populations could be regarded as reflecting different (sub-species). Further investigations are required.

Distribution

Kenya

The type locality of *B. c. omnivora* is Mazeras (03°58'S, 39°33'E) from which

(National Museum of Natural History; Washington, D.C., USA [NMNH]- 182699, 182275 [holotype],

Fig. 1. Illustration of a Sokoke bushy-tailed mongoose *Bdeogale crassicauda* cf *omnivora* based on what is probably the first photo record of a live Sokoke bushy-tailed mongoose (drawn to scale).

and 182281). Other specimens were collected in 'Tiwi' (ca 04°10'S, 39°27'E, Field Museum of Natural History, Chicago, IL, USA [FMNH]-85974; labelled: '16 July 1956, H. Hoogstraal, Kwale, Tiwi' (Van Rompaey, pers. comm.)), and the Arabuko-Sokoke Forest, ca 20 km south of Malindi (ca 03°14'S, 40°05'E, NMNH-318111; Los Angeles County Museum of Natural History, Los Angeles, CA, USA [LACMNH]-56749 and 56750, National Museums of Kenya, Nairobi, Kenya [NMK]-290 A 1596, 1597, and 1598). Taylor (1986) mentions having trapped three further specimens at Gedi, near Malindi (ca 03°18'S, 40°01'E). The Los Angeles Museum holds at least one specimen each from Milmani (Boni Forest, close to the Somali border) (LACMNH-42940) and the Kipini area (02°31'S, 40°31'E). Both of these may belong to the subspecies *omnivora*.

Tanzania

Allen & Loveridge (1927, 1942) collected two specimens: one in Philipshof in the Usambara Mountains (Museum of Comparative Zoology, Cambridge, MA, USA [MCZ]-22615) and one in Magrotto (05°02'S, 39°06'E) (fig. 3). In their 1927 paper they state that, according to the local inhabitants (Wakami), exactly the same species occurs in the Uluguru Mountains. The Tanzanian specimens are blackish and may belong to *B. c. crassicauda* (Kingdon, 1977).

Status and competition

The four-toed mongoose *Bdeogale crassicauda* is a little known member of the family Herpestidae, found in Eastern Africa from Kenya in the north to Zimbabwe in the south. Its distribution is not continuous and five subspecies have been described (see fig. 2; Taylor, 1986).

Apart from the Luanguea National Park (eastern Zambia), where *Bdeogale crassicauda* (cf *crassicauda*) is common (Bock, pers. communication), *B. c.* must be regarded as uncommon to rare and

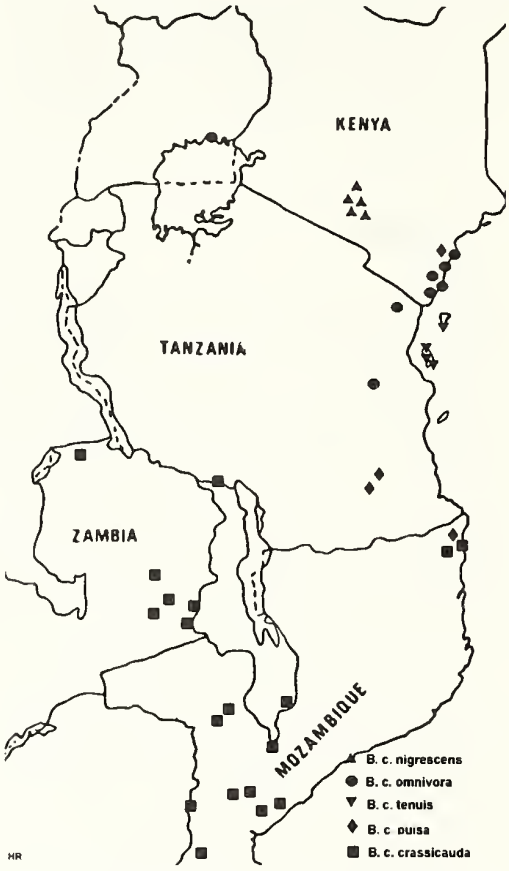

Fig. 2: Distribution of the five subspecies of *Bdeogale crassicauda*; from data supplied by C. Wozencraft, Museum of Natural History, University of Kansas (after Taylor, 1986).

patchily distributed; the causes of this rarity are unknown.

Kingdon (1977) suggests that its distribution is the result of a drying of the environment, and that its previous habitats were more forested. Thus, as the forests of East Africa receded, *B. crassicauda* became isolated and evolved from *B. nigripes*. Taylor (1986), on the other hand, argues that, if this model of speciation is true, one would expect either a much wider distribution of this species in isolated forests or, since it also occurs in rocky outcrops and bushy areas, a greater colonisation of this type of habitat. As this has not been the case, he suggests that *B. crassicauda* may be

an inherently rare species, and a rare component of the carnivore community.

In the Shimba Hills National Reserve the bushy-tailed mongoose coexists with the African civet (*Civettictis civetta*), the marsh mongoose (*Atilax paludinosus*), the slender mongoose (*Galerella* (*Herpestes*) *sanguinea*; pers. comm. F. Alexander), the white-tailed mongoose (*Ichneumia albicauda*), the large-spotted genet (*Genetta rubiginosa* ['*tigrina*']), and the honey-badger (*Mellivora capensis*). All these species have been observed in the field (including one slender mongoose) by the author. I twice trapped and photographed the two-spotted palm civet (*Nandinia binotata*) in the Shimba Hills (probably also for the first time).

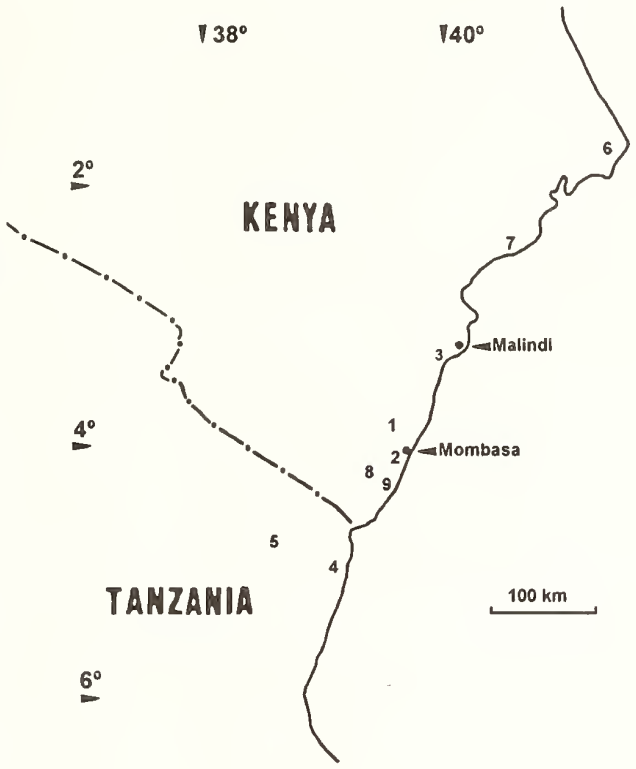

Fig. 3: Known records of *Bdeogale crassicauda omnivora*. 1: Mazeras; 2: Tiwi; 3: Arabuko-Sokoke Forest; 4: Magrotto; 5: Usambara Mts; 6: Boni Forest; 7: Kipini; 8: Shimba Hills National Reserve; 9: Diani Beach.

Little is known of the diet of *B. c. omnivora*. Allen & Loveridge (1927) baited a trap with meat. They found beetle remains in the stomach, and droppings, believed to belong to the species, contained crab remains. According to Ewer (1973) the wide blunt-cusped molars and molarised carnesials of *Bdeogale* suggest the predominance of vegetable food in the diet. Williams (1951) claims *Bdeogale tenuis* (= *Bdeogale crassicauda* ssp *tenuis*) to feed extensively on *Achatina* giant snails at Zanzibar. Although named '*omnivora*' it would seem that the bushy-tailed mongoose is chiefly insectivorous, but may also take crabs, rodents, snails and other small prey. Viverrid dropping sites of different species (mainly civet and an unobserved mongoose species) in the Shimba Hills also regularly contain fruits and seeds.

Further observations

At Diani. In February 1990 Dr K. Bock examined a mongoose (different from the marsh mongoose) which had been killed on the road at Diani Beach (ca 04°18'S, 39°33'E). It resembled the bushy-tailed mongoose (*B. c. crassicauda*) known to him from Zambia. Unfortunately only hair samples were taken. After microscopic examination, Bock noted that the "banded hairs conform with illustrations in Kingdon" (1977) and identified them as coming from *B c. omnivora*. In November 1990 Bock similarly identified a second road kill also as *B. c. omnivora*. Williams (1951) mentioned (with uncertainty) *B. crassicauda* Peters [ssp] probably occurring at Diani Beach.

Diani Beach is one of the major tourist resorts on the Kenya Coast and there are now hotels along most of the beach front. The area under undisturbed natural forest and bushland has been greatly reduced over the past 20 years and there are numerous permanent increasing local settlements between Diani Beach and the Shimba Hills National Reserve, situated about 20 km away in the hinterland.

At the Shimba Hills. According to the warden of the Shimba Lodge, Ishmail Kafuna, he and the late John Arkle noted a "bushy-tailed mongoose" (not a Marsh mongoose, which is common at the Lodge) on a game drive at Marere within the Shimba Hills National Reserve *ca* 1992.

Of the many mongoose observations during 1993-95 by the author, five may have been of *B. c. omnivora*. One of these was of an adult followed by a youngster. Other recent sightings of specimens very similar to the one in fig. 1 were early at night twice near Longomwagandi Forest, and another south of Makadara forest, with a tail slightly less bushy but not slender.

Conclusions and protection

Few specimens of *B. c. omnivora* are known and, since it seems endemic to the rapidly decreasing coastal forests and possibly other natural habitats, it is almost certainly endangered. Moreover, there are no records of it being kept in captivity (Schreiber *et al.*, 1989). The Shimba Hills National Reserve and its surroundings are most important as the last major refuge for more than 1,100 higher plant species and an unknown much higher number of animal (including invertebrate) species.

The discovery of the Sokoke bushy-tailed mongoose in the Shimba Hills, in Tiwi and Diani Beach increases further the very urgent the need of conservation efforts to:

- Stop further forest destruction and destruction of natural vegetation along the coast, especially in the few remaining natural forests and around Diani Beach, Ukunda and Tiwi. The building of tourist establishments and local houses requires huge amounts of hardwood. This is mainly taken from the endangered and already overexploited mangroves along the Kenyan south coast and also from the remaining natural forests in (south-eastern) parts of the Shimba Hills, where at present whole forest areas are still being selectively and illegally destroyed. Hardwood logging also still occurs in the centre of the reserve, where recently forest islands were damaged, even one containing established official research experiments.

- Fully protect the Arabuko-Sokoke Forest area, where not only the endangered Sokoke bushy-tailed mongoose but other endemic species are also known to occur. Actual plans to degazette parts of the Arabuko-Sokoke Forest should not be tolerated as already only very few self-sustainable natural habitats remain along the East African coast.

- Ban the common practice of indiscriminate use of fire in the area (including the Shimba Hills National Reserve), which is not only contributing to pollution of the world atmosphere, but causing local nutrition loss and soil erosion and killing wildlife and destroying important 'waste lands', which may be regarded as small island like genepools and refuges for the migration and survival of species in the settled areas.

- Fully protect and probably upgrade the Shimba Hills National Reserve to National Park status.

- Awareness and a better equipped Forest Department to stop the continuous large scale wood poaching (including 'legal' forest destruction) and a long lasting timber policy are among the main essentials for the survival of the local fauna and flora, amongst which is the rare bushy-tailed mongoose.

Acknowledgements

My special thanks go to Harry Van Rompaey (IUCN, Belgium), who reviewed the draft version and added many details; also Glynn Davies helped with literature; Ken Bock helped with some stylistic changes.

These observations were made during a current study on comparative seed dispersal and natural forest regeneration as part of a German tropical biodiversity research program kindly sponsored by the 'Deutsche Forschungs Gemeinschaft'. I wish to gratefully acknowledge the support by the Republic of Kenya and the Office of the President who granted the research permit, the Botany Department of the University of Nairobi, the National Museums of Kenya (for this publication especially the Department of Mammalogy), the Kenya Wildlife Service (particularly in Kwale) and the Institutes of Biogeography and Plant Physiology and by the Ecological-Botanical Garden of the University of Bayreuth in Germany. I thank many individuals, although not personally mentioned here, for their kind support in many ways.

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Short Communications

GIRAFFE RESCUE AT KILIMANJARO BUFFALO LODGE[1]

Sometime during the course of the night of 25 October, 1995, a pregnant giraffe fell through the concrete cover of an old sewage pit located just beyond the electric fence which surrounds the Kilimanjaro Buffalo Lodge near Amboseli National Park. Masai herdsman reported the problem to the Lodge manager at 9:15 a.m. the following morning. On closer inspection he found that the chances of saving the giraffe were remote because the dimensions of the brick-walled pit were almost the same as the giraffe, thus blocking any lateral movement, and so deep that only her head showed above ground level. None the less, it was worth a try.

Lodge gardeners and farm workers were immediately called in to start digging a wide trench leading down to the side of the pit. An American tourist, Mike Riley, was asked to stay near the helpless animal in an attempt to keep it calm. The Kenya Wildlife Service (KWS) Senior warden at Amboseli, Mr Kalla, was called and asked for assistance.

Digging the trench was exhausting work due to the dry, compacted soil littered with large rocks. The lodge staff were tiring when a KWS truck full of rangers, under the command of Mr Mabrakie Mzee, arrived and fell to work with a will. Soon afterwards the Senior Warden arrived, accompanied by an assistant, Mr Macharia. Hot on their heels came the KWS Kajiado District Warden, Mr Wilfred Ngohze. The KWS team assessed the situation and decided to call in a tractor-shovel from Amboseli to speed up the process of saving the now exhausted animal.

The trench diggers took exception to this and started excavating in earnest. Deeper and deeper they went until finally, at 1:45 p.m., they reached the pit wall which they tore down, then slowly backed away. With a little coercion the giraffe finally turned and, with faltering steps, made her way up the slope. Suddenly realising she was free, she took a last look at her saviours who cheered, then gracefully ambled away.

Ian Vincent, Kilimanjaro Buffalo Lodge, Amboseli National Park.

[1] This is a report sent to the Mombasa and Coast Tourist Association and used with their permission.

PIED CROWS (*CORVUS ALBUS*) HARASSING WHITE-BACKED VULTURES (*GYPS AFRICANUS*)

On 21 September 1996 at about 0900 h in Nairobi National Park a large group of white-backed vultures (*Gyps bengalenses*) were on the ground. About four or five Pied Crows (*Corvus albus*) were harassing the vultures. The crows were pulling their feathers and kicking them repeatedly. The vultures did not react except to pull away when the harassment became too much, but took no further action. This went on for many minutes before I had to leave.

It seems quite strange as I cannot see why the crows should want to interfere with the vultures. This had no resemblance to the well known mobbing of predatory birds by other birds. It may be argued that the vultures are to some extent in competition with the crows as their feeding habits overlap somewhat.

Has anybody seen similar interactions

between crows and vultures? If so, I would very much like to hear about it.

Judith Rudnai, P.O. Box 42220, Nairobi

THE PUBLIC CAMPSITE AT AMBOSELI IS IN A DEPLORABLE STATE

Many years ago when the campsite at Amboseli was moved from the Oltukai area to the present site, it was neatly laid out with feeder roads, latrines (long drops), a hand water pump, rubbish pit and some of the bush was cleared.

The group ranch which is running the campsite made quite a show of putting up signboards asking campers not to leave bottle tops, paper, tins, cigarette butts, *etc.*; this has, as would be expected, been largely ignored, and nobody is there to follow it up.

At the time elephants soon discovered that campers carry palatable things with them, and many vehicles and coolboxes were damaged by them.Some years ago the group ranch made a staunch effort to eliminate the elephant threat to campers by erecting a solar-powered fence. This worked fine until a few years later when the fence fell into disrepair. Again the elephants quickly re-discovered the tasty food "offered" by campers.

I was camped there at the end of February 1996, for a few days. When enquiring about the behaviour of the camp elephants, I was told that there was only one which liked cabbage! One night while I was there the windows of a vehicle which belonged to a well-known safari company were smashed by an elephant. Presumably it found more than cabbage to its liking. In the morning, out of a herd of elephants there were more inside the campsite area than outside.
The bush has not been controlled for years, and during the day cattle and decrepit donkeys graze on the campsite. It is an absolute disgrace that a campsite, which is serving one of Kenya's prime national parks is in such a deplorable state. It is high time that the KWS took charge of a campsite for Amboseli and managed it for the enjoyment and safety of campers.

Frants Hartmann, P.O. Box 40, Thika.

[The editors have been informed that the latrines are also full and unusable.]

Book Reviews

The Afrotropical Tiger Moths by D.T. Goodger & A. Watson. Pp 65. Four plates, 108 photographs. Apollo Books, Stenstrup, Denmark.

Up to date catalogues and taxonomic reviews of groups of closely related insects, to sub-family level and above, covering a whole zoogeographical region, such as the present volume, must be warmly welcomed. They allow interested entomologists to re-sort and name their collections and to revise their opinions on relationships and identity. The changes proposed may not always be acceptable, but this only means that more work will be done to establish a new level of knowledge. At present when the study of biodiversity is accelerating the publication of such a review means that another group can be included in biodiversity surveys with more confident identifications. Increased knowledge of the group, some of which are quite conspicuous and common, may prove to be quite important as many of the species are commonly caught in various kinds of moth traps. With more knowledge they may become a useful indicator group.

The authors note that much of the

work done on the group has been taxonomic, although some species are important pests of cocoa and cotton, at least in some parts of our zoogeographical region. Some members of the group also have rather bizarre and complex associations with chemical-producing plants. The means of up-take and use of these usually noxious chemicals certainly must merit further research. The lack of knowledge of the biology of the group is also emphasised by the fact that the food plants are listed for only 72 species out of 411 and that it is stated that some generic limits cannot be finalised from lack of data, particularly the fact that many of the larvae remain unknown. This provides an opportunity for entomologists working in areas where the insects are found to eliminate these gaps in present knowledge.

A lack of detailed knowledge of the group does not allow criticism of the catalogue and taxonomy, but the provision of photographs of male genitalia, together with the very clearly produced colour plates should allow any student of the group to quickly identify a specimen to genus level. The geographical data given in the catalogue will then help the identification to specific level.

Both authors and publishers are to be congratulated on what must become a much used work. Apart from the catalogue it contains an index, and a comprehensive bibliography.

The publication may be obtained from Apollo Books Aps., Kirkeby Sand 19, DK-5771 Stenstrup, Denmark, at a price of Danish Krones 200.00.

I.A.D. Robertson, Box 162, Malindi. Kenya.

Society News

86th ANNUAL GENERAL MEETING

The 86th annual general meeting of the Society was held on Monday 13 May, 1996, in the Louis Leakey Memorial Auditorium of the National Museums of Kenya. Agenda items were approval of the minutes of the 85th AGM, matters arising from these minutes, Chairman's report, Honorary Treasurer's report and presentation of audited accounts for 1995 and election of the executive committee and of several sub-committees.

In the absence of the Chairman, the meeting was chaired by the Hon. Treasurer. The Chairman's report and the audited accounts are reproduced below. Members of the newly elected executive committee and sub-committees are listed on the back cover.

The meeting was followed by a viewing of the first part of Alan Root's new film series on the Rift Valley "Mountains of Fire and Ice".

Chairman's report, 1995

Ladies and Gentlemen,

I am sad that, because of unavoidable work commitments, I cannot join you today at our 86th Annual General Meeting. Thank you all for being here and taking part in this important event in our Society's calendar.

The last year, although not without its difficulties, has generally been a good one for the Society. The office has continued to run smoothly; after experimenting with opening hours we seem to have settled on times that suit most people, and I believe that the service to members has improved as a result. We now stock an increasing range of publications on flora, fauna and conservation, many of which are difficult to obtain elsewhere. The eventual objective is to become a one-stop biodiversity bookshop.

Rowena Costa-Correa, our Office Manager, has done an excellent job over the past year, and I would like to thank her for all her dedicated work. Rowena is now taking up a position as Director of the Elsamere Field Studies Centre, and I am sure that you will join with me in wishing her every success in this challenging position. I would also like to thank, among others, Inga Ayres, Louise Fordyce, Charlotte Harvey and Catherine Ngarachu for their assistance in the office at various times. Vincent Owuor continues to provide indispensable office support as the Administrative Assistant to both the TBA and EANHS—those involved with the office will realise how much useful work he does for us.

As our Honorary Treasurer will explain, we remain in sound financial health, with a small surplus over the last calendar year. Unfortunately this is no cause for complacency. The major costs of running the Society—printing, postage and office expenses—continue to escalate at a rate both alarming and entirely out of our control. This year a large part of our office costs has been recouped from projects, and we hope that the burden of producing the Journal will begin to diminish as it attracts subscribers. Nonetheless the need for support from our members, and for imaginative fund-raising ideas, remain as great as ever.

Last December the Society's membership reached a record 1,340 individuals and institutions. A further 100 or so members have joined through our Uganda branch. This is an encouraging trend: more members give our Society more voice, as well as a degree of financial stability. Undoubtedly our potential membership is very much higher still. I would urge all our members to try and recruit at least one new member over the coming year. This is by far the most effective single way of giving support to the Society.

News on functions and outings is mixed. We have had a good programme over the past year, including some excellent speakers: thanks to those who have helped to organise these events, especially Major Kaigwa for co-ordinating most of the outings. Sadly, the attendance at our monthly Monday meetings and on many excursions has been very poor. There is no escaping the fact that many of our members are less inclined than before to venture out in the evenings, or away from town. Many also lack transport, and we have so far been unable to provide a reliable alternative to hoping for a lift. Since our lectures and outings are a very important part of our traditional programme, we shall be thinking of ways to overcome these problems over the coming year. Suggestions will be most welcome!

In contrast, many weekend and special events have attracted a high turnout. Succulenta East Africa has run an impressive series of field trips and practical sessions, including the communal construction of a rockery at the Arboretum. Friends of Nairobi Arboretum, the beneficiaries of this last event, have also organised a splendid and varied programme, culminating in 'Wind in the Trees', which seems set to become an annual musical festival. World Birdwatch, organised by BirdLife Kenya over the weekend of 7 and 8 October 1995, attracted good numbers of participants countrywide. Special events were held in Kisumu and Mombasa as well as Nairobi, providing a welcome chance to spread the Society's activities a little bit wider. The Society's Forest Publications Evening on 17 January 1996 was also a great success, thanks to sponsorship from the Mayfair Hotel and the British High Commission.

Our periodicals—the Journal and *EANHS Bulletin*, *Scopus*, *Ballya*, *Kenya Birds* and *Wetland News*—continued to appear with good to moderate regularity. Given that all the editorial and typesetting work on these publications is voluntary, it sometimes amazes me that they are produced at all, let alone in such a professional manner. The two initial

issues of the new-style Journal look handsome and have met with a good reception, which we hope will be translated into numerous subscriptions in due course! On behalf of the EANHS, my particular thanks to our Honorary Editor, Edward Vanden Berghe, for all his efforts.

The Society continues to run a range of other projects, most of which are managed by our various sub-committees. The Kipepeo Project over the last year has won increasing recognition and publicity for its innovative approach to involving local communities in forest conservation. Last September, VSO provided support for a volunteer, Tansy Bliss, to expand the project's education and awareness work in and around Arabuko-Sokoke Forest. I am happy to say that the Netherlands Committee for IUCN and thereafter BirdLife International will be providing funds to ensure this work can continue. In January the Kenya Wetlands Working Group began two major projects, to continue work on a wetlands inventory, focusing on Uasin Gishu District, and to develop a wetlands bibliography for Kenya. These projects are supported by the Global Environment Facility and the Netherlands Embassy respectively; three wetlands Research Fellows, Peter Njuguna, Richard Odongo and Charles Maina, have been working busily since January and progress is good. BirdLife Kenya and BirdLife Uganda are co-ordinating the Important Bird Areas programme in their respective countries, with support from the Royal Society for the Protection of Birds. This exciting programme aims to identify sites in Africa that are of key importance for bird conservation, and thus for the conservation of biodiversity in general.

Increasingly, the Society is also taking action to help save threatened sites and habitats. Last month we were again forced to speak out loudly on the issue of de-gazettement of Arabuko-Sokoke Forest—an action which appears to have had some positive effect, at least for the time being. We continue to work hard to set up a Biodiversity Park around the wetlands near the Carnivore Restaurant. The situation is complex and difficult, but there is still hope that this extraordinarily rich site could be saved as an amenity for the city of Nairobi. We are also helping to set up the Friends of City Park, a group along the lines of FONA. I am sure you would agree that City Park needs all the friends it can find, and I hope that members will give tangible support to this venture. Unfortunately the conservation crises over the last year have cropped up faster than we can possibly attend to them, even as one of a group of concerned NGOs, and they put increasing strain on our small and hard-pressed staff and the Executive Committee.

This report should end, though, on a positive note. With the active participation of all our members, I have no doubt that we can look forward to an excellent and productive year ahead. My personal thanks, as ever, to our Vice-Chairman, Dr Richard Bagine; Hon. Secretary, Lorna Depew; and Hon. Treasurer, Mark de Meyer; and to the rest of the Executive Committee and all the Sub-committees for their help and co-operation. Our Society is healthily diverse in its membership and its activities, but our goals and our vision are shared and we are moving with increasing momentum—in, I believe, the right direction.

Thank you.

Hon. Treasurer's Report, 1995:

The Society ended the year with an operational surplus of KSh 49,610. This is only 67% of last year's surplus, despite the fact that the subscription rates were increased.

If we look at the income for 1995, we notice that the income from subscription rates raised by 23%. This is due to the increase in the rates but also to an increase in number of members (albeit

the latter was mainly in the students category).

The Society's office sales also went up drastically with commission charged on the sale of books and other publications proving to be a large income earner. This reflects the importance of the Society's office as a centre where one can obtain an ever larger number of publications on natural history which are otherwise hard to find in the country.

The income from interest was very low in 1995 (KSh 409 compared to KSh 92,631 in 1994). As indicated already in last year's report this was largely due to the fact that the Society had to dip into her savings to advance the publication costs for *Upland Kenya Wild Flowers*. These costs are only now recuperated through sales of the book and the income will once again be deposited in high interest accounts. Another reason for the low income from interest rates is the fact that the Kenya Shilling has stabilised the last year (compared to the extreme high inflation and depreciation of the last years) hence resulting in a much lower interest offered by banks. The total income for 1995 increased about 21%.

Looking at the expenditure, we noticed a large increase in costs of members' services. This is mainly due to an increase in publication costs. First, there is the revival of the Society's journal (which has merged with the museum's publication and is published twice a year) which proved to be a large expense. Secondly, there is the increasing printing costs for the *EANHS Bulletin*. In total, this has more than doubled the publishing expenditure (from KSh 172,232 in 1994 to KSh 366,754 in 1995). We hope to recover a large part of the Journal's printing costs through the subscription rates. Other costs of member services (like production and postage of newsletter) have not increased substantially.

Administration costs also have risen enormously. As indicated earlier, the Society's office is becoming more and more the administrative headquarters for a number of the Society's subcommittees. This results in an increase in photocopying, telephone and other costs. In addition the Society tries to provide a better service to its members through the office manager. It was therefore agreed that the several subcommittees should contribute to the general expenses of the office by paying administrative overheads. Thanks to these recoupments we could actually reduce the net administrative costs for running the office, which are now down to KSh 70,143 compared to KSh 190,666 last year. The total amount of expenditure has risen from KSh 528,328 in 1994 to KSh 680,307 in 1995 or a 29% increase. The difference between the larger increase recorded in expenditure compared to the increase in income resulted in the smaller surplus for the year 1995.

We can conclude that the Society is still in a healthy position but that the balance between expenditure and income is a small one. As was the case in the past, the actual income of the subscription fees only covers 61% of the costs for the services provided to the members of the Society (and this does not include running the office and staff costs) and therefore we still rely heavily on income from other sources. It is not considered fair to our members however to yet again burden them with an increase of the subscription rates at this moment. We therefore have to be careful not to overspend the scarce revenues we have and we should try to economise as much as possible. But we are looking at the future optimistically. The Society is very active and thanks to the commitment of several of our members who are willing to take up a number of tasks voluntarily, we are sure that the Society will be able to keep up the excellent service that we try to give.

Income and expenditure accounts for the year ending 31 December, 1995, including a comparison with those of 1994:

		1995	1994
INCOME			
Subscriptions		K.Sh. 318 674 . 00	K.Sh. 258 234 00
Office sales		273 865 . 00	77 098 . 00
Other income		137 378 . 00	266 639 . 00
Total Income		K.Sh. 729 917 . 00	K.Sh. 601 971 . 00
EXPENDITURE			
Cost of member services		K.Sh. 524,747 . 00	K.Sh. 290 702 . 00
Cost of office sales		85 417 . 00	46 960 . 00
Administration costs	431 882 . 00		
Less recoupments	361 739 . 00		
Net cost of administration		70 143 . 00	190 666 . 00
Total Expenditure		K.Sh. 680 307 . 00	K.Sh. 528 328 . 00
SURPLUS FOR THE YEAR		K.Sh. 49 610 . 00	K.Sh. 73 643 . 00

APOLOGY: An extremely highflying gremlin appears to have soared into the article "Lesser Flamingo Breeding Event at Lake Natron, 1995" Vol. 26:1. The Editors wish to apologise for this rather extraordinary mistake which we somehow missed. The figure should have been 1500 feet above ground level not 2400 km (the authors point out to us that aerial survey work is always recorded in feet, so the conversion was not, at any rate, necessary).

MEMBERSHIP

This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society-National Museum Library (postal borrowing is possible) and a copy of the *EANHS Bulletin* every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

JOURNAL

The Society publishes, in collaboration with the National Museums of Kenya, the *Journal of East African Natural History*. The *Journal* is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Editor, Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

EANHS BULLETIN

This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), Box 44486, Nairobi, Kenya.

SCOPUS

The Ornithological Sub-committee publishes this journal three times a year, cost KSh. 600 per annum. All correspondence to D.A. Turner, Box 48019, Nairobi, Kenya.

BALLYA

This bulletin is published three times a year by Succulenta EA, a division of the EANHS. Members of the EANHS can join Succulenta EA, at a cost of KShs 400 per annum, and receive *Ballya*. Contributions for *Ballya* can be sent to Edward Vanden Berghe, Box 44486, Nairobi, Kenya.

EANHS MEMBERSHIP RATES PER ANNUM

	Local KSh.	Overseas US$	£Sterling
Life	7500	200	130
Corporate	5000	200	130
Sponsor	1000	50	35
Institutional (schools, libraries)	500	30	20
Full	350	15	10
Family	500	-	-
Pensioners	100	-	-
Student*	100	10	7

*Only children under 18 and full time university undergraduate students. Graduate students must register as full members.

Subscriptions are due on 1 January. From 1 July you may join for half the yearly subscription and receive publications from that date. Application forms for membership are obtainable from the Secretary, P.O. Box 44486, Nairobi, Kenya.

THE EAST AFRICAN NATURAL HISTORY SOCIETY

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BULLETIN

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Your Editors wish to express their sincere apologies that due to press of work we have been delayed in getting out the last two issues of 1996. We decided for this reason and because of the extremely high cost of printing, which is no longer supported by subscriptions, to combine the last two issues of 1996 into one.

Articles and Notes

BELIEVE IT OR NOT

A recurrent problem in farming in the remote and wilder parts of the World is coping with the wild animals. It is most disheartening to plant wheat and find elephant or zebra wandering about in it, eating and crushing a high percentage of the crop. The carnivorous animals are over fond of sheep and cattle and find them much easier to catch than their natural prey. Even the smaller, and very pretty, antelopes are annoying when they find some rose bushes, and demolish leaves and petals overnight.

During 24 years on one farm in Kenya we eliminated 24 leopard, because they killed our sheep and calves. We always allowed the raider to take one or two head of domestic stock, without penalty, hoping that he or she was a migrant and would move on in a day or two. But usually, once they had killed a sheep they became addicted, and we had to do something, even if it was only to swap stories in the Club next time in Town. Leaving an oil lamp glowing all night perhaps, or setting an automatic acetylene gun to bang away at intervals all night.....or sitting up all night with torch and rifle over a kill waiting for that stealthy crouching shadow to appear. It usually seemed to be either cold or wet, or a field day for mosquitoes! But it was usually always tense and exciting and although we failed many, many times; I suppose having adrenaline pumped around one's insides might be good for one?

The 18 months ending in August 1996 had been particularly trying for ourselves and 4 of our neighbours, all stock farmers running cattle on a free range system. During that period a small pack of Spotted Hyena had killed or maimed 168 head of cattle, and many sheep. Everyone was trying to kill or catch them, either by shooting or trapping or poisoning. The pack attacked by running alongside a stampeding herd and either jumping on to the shoulders and neck, thus bringing the animal down or by biting through the front leg bone causing the animal to stumble and fall. Often only a part of the animal was eaten and when found next morning had to be shot. The Hyena being much cleverer than the Leopard or Lion, quickly sees that it is hunted and will not return to a kill. They can also smell or detect if a herd of livestock is guarded in any way. Sometimes we succeeded in poisoning, but this particular pack seemed to be very worldly wise and avoided all plans to get rid of them.

After they had raided, and killed a steer of about 800 lb. weight—this was the usual size of their victims—I found the tracks in fresh mud and followed for about two miles into thick bush. Whispering to the African herdsman that we might find them this time, we ended up in a gully of eroded banks and flood water courses, with several holes in the banks. Whilst searching every foot of ground, to my amazement I found what looked like some large sequins lying on the sand! My first thought was that had come off a lady's evening handbag! But HOW?! And if not that, perhaps fish scales? Again HOW, way out in the dry bush miles from water?! Then sign of scuffling and many more scales....and finally a very dead and much mangled python, which when unravelled measured 13 ft! From this point on the Hyena spoor was blotched by a heavy blood mark. So we followed until it led into a large hole in a bank. We blocked that hole up with rock and thorns and guarded it night and day for three days and nothing even stirred and the stock killings stopped. Apart from some half hearted attempt which we

managed to deal with about two weeks later. My guess was that the pack leader found the Python in a hole it wanted to use and fought it for possession, killing it but sustaining serious injury by either crushing or biting from which it died inside the hole we watched.

Anther example that fact is stranger than fiction and certainly African Bush adventures were seldom dull.

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SHIMBA SOUTH KIPEPEO PROJECT

I had little idea of how things would turn out when I first thought about doing some kind of butterfly work in the Shimba hills, I had previously been working voluntarily at the Kipepeo project, Gede, doing a small study on the distribution of *Charaxes* butterflies in the Arabuko Sokoke forest and helping with the collection of butterflies for breeding. The Kipepeo Project, under the auspices of the EANHS and National Museums of Kenya, has for the past four years taught forest edge communities in the Arabuko-Sokoke Forest to farm butterflies in order to sell their pupae for export to live exhibits in Europe and now America. These communities, like others country wide, often experience considerable loss from crop raiding animals. It is only by the implementation of compensatory projects that local attitudes towards the conservation of these forests can be broadened as well as encouraged. I knew that Dr Ian Gordon, who heads the project ,was keen for some kind of work to happen in the Shimba Hills because some of their forest butterfly species are much less seasonal than those in the Arabuko-Sokoke Forest. Kenya Wildlife Service (KWS), Kwale, were also keen for some kind of programme, what with the Kipepeo project being one of the few community based projects which has succeeded in generating tangible cash returns to forest edge communities, whilst also promoting and changing attitudes towards forest conservation. I felt I could be of much more use to the project helping with some kind of work up there, at least for a while. I had no idea however that I would end up teaching six communities along the national parks electric fence line, covering some 22 Km in the Shimba South area, how to farm butterflies.

Charaxes protoclea

At the end of January 1996, I was dropped off at the KWS bandas just inside the park at Kwale, with various mounds of "clobber", somewhat uncertain, but more or less ready for my task. The following Wednesday KWS were sent to give me a lift to the community where I was to set up base as there was a small, semi-finished hut for future use with the electric fence line. The hut was in Mbokweni community near a small village called Lukore. Mbokweni were to make up the first community to be taught. Due to various delays I was dropped off after dark to a somewhat bewildered community who did not expect what they thought was their "butterfly expert" to be delivered to them at such a dubious hour. Various reassurances were made that this was simply due to bad timing rather than to any plan of secrecy as to my identity.

At my first sight of the KWS hut which at that time had no doors, a few seeds of doubt began to sprout in my mind. However the next day the doors were fixed on by the local carpenter who was kindly paid by the

community. My first worries were those of security, but apart from several large rats with whom I waged a five week war created by the continual nightly disappearance of my dettol soap, the only time I did get worried and thought I was being set about I courageously leapt out of bed and after scrambling for the largest knife at hand. It turned out to be a similarly distraught young house snake, who like me, was rapidly trying to escape the situation.

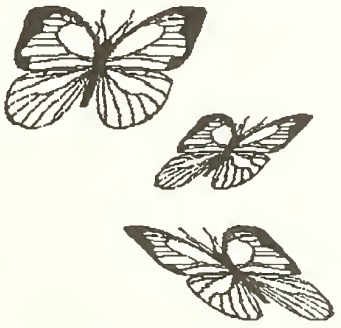
Mbokweni community were welcoming from the day I arrived. Kabbi Harri who by my good luck was an undying enthusiast was a tremendous help in everything I did. He, in fact, having previously no knowledge of butterflies at all, taught the last three communities himself. He is now set to be the group co-ordinator for the project, helping with community problems and collecting their pupae for transport to Mombasa for sale. His reassuring advice on the fastest way to climb trees in the forest if a buffalo appeared seemed dubious, but after hearing that, were it an elephant, it would probably pull the tree down anyway, had a way of renewing one's thoughts on spirituality. However his knowledge of indigenous plants and virtually every family in the area made the whole job a lot easier. "Mzee Paulo" on whose land I was living was a shining light providing boundless supplies of cassava and coconuts for lunches, as well as having an excellent orchard.

The first lessons were held in mid-February after a couple of weeks exploration. The lessons began in a fair amount of confusion on my part as what to expect, never previously having done any community work and on theirs, by complete lack of belief that money could be earned from farming butterflies. The result was that the first two lessons were something of a comedy show. By this time Kabbi and I had constructed two small flight cages together with two bamboo benches outside my hut and we had set up the second room of my hut as a caterpillar rearing room with some space for equipment storage. Lessons were taught to each community separately over four weeks with one lesson a week, although everyone was divided into groups coming on different days depending on when they were free. By mid-March Mbokweni community were ready to start work and after a couple of sewing days to put together some butterfly catching and laying nets everyone was given equipment. Later, as with the other communities, we also distributed second hand ice cream containers for caterpillar rearing, many of which were supplied by some of the coastal beach hotels whose tourists, I'm sure, would be glad to know that just by eating ice cream they were helping the progress of Kenyan conservation.

After finishing up Mbokweni community I had a week's break in Mombasa where I managed to get plans under way for a project information booklet for the communities. Tumaini Kemibaro who kindly agreed to do the colour butterfly illustrations was as he would say "the fall guy" for the idea. Over the next two months two more communities, Mawia and Magwasheni were taught and the project store room began to make its first money allowing us to buy more equipment. Mbokweni also made their first KSh 610, their shipment being somewhat lightened by a greedy lizard who consumed 17 pupae the night before they were taken for sale. The neighbour hood children had also become an invaluable source of caterpillars which they were allowed to trade for sweets outside school hours. It seemed they had better caterpillar nurseries going than me anyway.

It was as I was organising the black and white copies for our community booklet in Mombasa when by complete surprise we had our first brief newspaper article mentioning a butterfly project in the Shimba South area which had initiated an "elaborate educational campaign"; needless to say I was deeply

flattered at this description of my small hut with its few bamboo benches and my only aid, a single copy of the Collins hand guide to the butterflies of Africa which has been in my possession since pre-adolescence. By mid-May, after overcoming the serious task of supplying our invaluable caterpillar collectors with satisfactory sweets, three communities had been taught and equipped and lessons were beginning for the next two. Plans now had to be made for all communities to get themselves registered as self-help "Kipepeo groups". For anyone who has not experienced this inexplicable "rigmarole" I would not wish it upon my worst enemy. Trying to get all the members of one Kipepeo group together at the same time on the same day is near impossible; if there is not a wedding, there is a funeral, earthquake or eclipse, even pigs seemed to fly in order to obstruct the registrations. Finally after an extremely trying first ten days of June all group registration details were obtained and ready to go off to Kwale with the social development assistant. By now pupae sales had begun to take place regularly twice week, the pupae being carried by Kabbi on "matatu" to the "Securicor" office in Mombasa for transport to the Kipepeo project, the fare being paid by the pupae sales and the cost divided equally by all Kipepeo groups who make a sale.



Eurema hecabe

Outside my hut the small flight cages were being raided nightly by bush babies who were very adept at eating all my best butterflies, my bamboo benches had begun to collapse from rot, I was having regular battles with soldier ants and my shower shack had begun to sprout leaves and was growing into a fully fledged bush. In addition two of my neighbour's wives who were pregnant when I arrived had given birth. I'm not too superstitious but perhaps nature was urging me to get a shift on.

At last after much worry the long awaited booklets were put together and I was able to distribute one to all the elected trustees of each community's Kipepeo group. Around the same time towards the end of June we got all the certificates of registration back which was a great relief. I couldn't believe my luck; the groups had also all managed to raise the 500 KSh necessary to open a savings account at the "Post Bank". So in jubilant moods we set off to open our the accounts up in Lukore village only to find that our photos, needed to open the accounts and which had taken me a month to organise, were no good; I had taken each person separately and all three members in control of the account had to be in same photo together. My mood was brightened though by a farewell party which was held for me by Mbokweni Kipepeo group. I'm happy to say that, after a lot of indecision as to how much food needed to be bought, there turned out to be enough vegetable pilau and "mandazi", so much so that not one person had to do any cooking that evening. The day was even better by the treat of having a whole bucket of water to wash with.

Soon after leaving in early July I came back with a pick-up truck to cart some of my stuff back to Mombasa whereupon a song was sung for me by Mbokweni's newly formed Kipepeo group choir. Never have I been so honoured. The story by no means ends here but it was at least the end of the beginning and then begins the task of meetings, finding funding and monitoring the project's progress. By the end of July pupae were still being sold twice a week, a small office together with a

small flight cage and nursery of larval foodplants had been constructed, as a project headquarters for Kabbi's work as group co-ordinator and we had also got a new bicycle for the pupae collecting. I am pleased to say that all the Kipepeo groups participated and provided free labour in the construction of the office and also provided building poles and sand for cementing. In all some 130 people were taught and equipped making up some 90 odd households along the Shimba South electric fence line and by the end of July the Kipepeo groups had earned approximately KSh 12,000 from pupae sales. Whilst this is not as much as they could have earned it is still a significant achievement and will, hopefully, form the shape of better things to come.

Whilst thinking of a suitable summary, if the whole experience had been a block buster "movie" I would describe it as "a roller-coaster cultural adventure tracking through tropical forest, trailing butterflies, all laced with cassava, coconuts, blue skies, mystical nights, with a few snakes thrown in for good measure.

However above all else I hope that the project helps to show the people I taught and others, what can be achieved with a minimal amount of money, but instead with co-operation and enthusiasm, when people put their minds together. And in this regard I hope that what has been achieved so far, as well as continuing to blossom, will also act as a spring board for many other ideas serving to increase education and the quality of people's lives around these forest areas whilst at the same time promoting the conservation of their own natural heritage.

Acknowledgements
I would like to thank Dr Ian Gordon of the Kipepeo project for allowing me such a tremendous opportunity and for having faith in the decisions I made. Additionally I would like to thank Dr Els Martens for providing funding for the construction and set up of the Shimba South office and for the community trip to the Kipepeo project at Gede. Last but not least my most hearty gratitude goes to Kabbi Harri Mwakanzere who worked with me from day one so untiringly and with such enthusiasm and without whom there would most certainly be no project.

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Butterflies by L.A. Depew

FISH AND FISHING IN THE RIVERS AND WETLANDS OF USANGU

This paper, based upon information collected in 1980–82, provides a preliminary description of indigenous knowledge of fish and fishing practices in the rivers and wetlands of the Usangu Plains of southern Tanzania. It focuses upon the knowledge, practices, and perceptions of the Sangu, the original inhabitants of Usangu, and reflects their concern over the alleged overexploitation of aquatic resources by more recent immigrants into the plains. Borrowing from more recent research reports, it also draws attention to the wider and more serious threat to the unique fish fauna of this area which is posed by other human activities in Usangu.

The Usangu Plains

The Usangu Plains comprise part of the eastern Rift Valley. They take the form of a shallow alluvial basin, which lies around 1,000 m above sea-level and covers an estimated area of more than 15,500 km^2. Ruaha National Park borders the plains to the north and the hills of Iringa district to the east. To the south and west they are hemmed in by the Southern Highlands and the

larger quantities were brought in by fishermen from the rivers and wetlands to the north and north-east.

The general term for fish in *ishisango* is*inswi* (noun class singular/plural 9/10). Most of the body parts of fish are referred to using terms which are also supplied to other creatures (*e.g. umutwe*, 3/6, 'head', *umufupa*, 3/6, 'bone', *umwimfwa*, 3/6, 'sharp spine; 'thorn'). Special terms are used, however, for the tail of a fish (*umupepe*, 3/6) and the mid-section between the head and tail (*ishiviligati*, 7/8, literally 'mid-body').

All of the Sangu names for fish which I heard in Utengule are listed below. This list is no doubt incomplete, because I only noted names as I came across them. It is also possible that Sangu in eastern Usangu know of species which do not appear in and around Utengule, or have different names for some of the fish which do. The majority of the Sangu living in the eastern plains speak dialects which are more closely related to Hehe (spoken especially around Madibira) and Bena (in Rujewa and the south-east) than to the *ishisango* of Utengule and its environs. Some phonological and lexical variation in local fish taxonomies should therefore be expected, though to what extent remains to be established.

I have added to the list probable linguistic cognates from the *Preliminary Guide to the Commoner Fish of the Ruaha National Park and Upper Ruaha Basin* compiled by Ian Payne, Vic Cowan, and Philip Townsley (1995) (hereafter PCT). Their 'local names' were mostly recorded in the east of Ruaha National Park along the Great Ruaha, Little Ruaha and Tugamalenga Rivers, and in the vicinity of Mtera Dam. Hehe-speakers dominate the polyethnic population of this area, and were the source of many of the names they give. It should be noted that linguistic equivalence (or similarity) does not entail equivalence of zoological reference: this can only be established by identification in the field. It is possible that some of the Sangu terms refer to more than one species, or fish in different colour phases or stages of growth. Nonetheless, the comparison with PCT forms a potentially useful starting-point for further research.

axansululansi, plural **utunsululansi** (12/13), described as a small fish, also called *inxamlepa*. PCT *sulu-sulu*; *Marcusenius macrolepidotus* (Mormyridae, Elephant Trunk Fish).

ilipandepande, pl. **amapandepande** (5/6), described as 'white' (probably silver) in colour, with a head the size of a frog's and spines which are painful if trodden upon. Cf. the root of *imende* (q.v.).

ilipongo, pl. **amapongo** (5/6), described as having spines which are painful if trodden upon.

imangwa, pl. **imangwa** (root *-pangwa*) (9/10), described as a largish fish which has a head like a snake and bites.

imende, pl. **imende** (root *-pende*) (9/10), described as a small fish, traditionally only eaten by the Sangu chiefs (*avatwa*) but not their subjects. PCT *monde; Petrocephalus steindachneri* (Mormyridae, Elephant Trunk Fish).

indaata, pl. **indaata** (9/10), described as a very large fish, only found where there is a lot of water. PCT *ndetete; Alestes stuhlmanni* (Characoidea, Characins).

ingangala, pl. **ingangala** (9/10), identified as Swahili *dagaa*; many of which are traded from Lake Tanganyika. PCT *ngala, dagaa, Bycinus affinus* (Characoidea, Characins). PCT also recorded *dagaa* as the name for two kinds of Barbel, *Barbus* spp. (Cyprinidae, Carps), and small fry in general.

iniingo, pl. **iniingo** (9/10), PCT *ningu*, Red-eyed Mudsucker; *Labeo cylindricus* (Cyprinidae, Carps).

inxampapala, pl. **inxampapala** (9/10), described as a medium-sized fish, Swahili (?)*gege*, PCT *ngege*, *perege*, Rufiji Tilapia; *Oreochromis urolepis* (Cichilidae, Cichlids).

insoshi, pl. **insoshi** (9/10), sometimes heard as *inshoshi*, Swahili *kambare*. catfish, described as the commonest kind of fish in and around Utengule and certainly the most widely fished, traded, and eaten. PCT *kambale*, Sharp-toothed Catfish; *Clarias gariepinus* (Siluroidea, Catfishes).

All of these fishes are, as far as I know, considered edible by the Sangu. The Sangu also gather a kind of freshwater bivalve called *inxambalala* (9/10). These are not eaten (except, it is said, by the Gogo), but the shells are used as a scraper to clean pots. The Sangu also recognise, but do not eat, at least two kinds of crab (*ilingengene*, 5/6, and *ilinxala*, 5/6) which are found by rivers and on irrigated farms. Other aquatic creatures known to them include a kind of terrapin (*igobe-mshenda*, 9/10), crocodiles (*inwena*, 9/10), otters (*inxonxomi*, 9/10) and hippopotami (*imfuvo*, 9/10).

As might be expected, the Sangu possess an extensive vocabulary for the natural aquatic topography of the plains. The relevant terms include *umuxoga* (3/6), 'river'; *ulukwavo* (11/10), 'seasonal water course'; *inangano* (9/10), 'confluence'; *ililoxo* (5/6), 'ford'; *umusalala* (3/6), 'waterfall'; *ishogo* (7/8), 'permanent or deep pool in a river'; *ilihavaga* (5/6), 'stretch of floodwater which is flowing'; *ilivindi* (5/6), 'swamp or marshy area with tall reeds and grasses' (*e.g.* created by river in flood); *ililamba* (5/6) 'pond or swamp'; *inxandilo* (9/10), 'dried-up pond or swamp'.

Sangu Fishing Techniques

I recorded the following traditional fishing techniques, whose use varies according to the seasonal abundance and type of fish available and the kind of water resource which is being fished:

The simplest method used is to catch fish by hand, with or without the help of a piece of cloth. This is quite easy to do when fish are isolated in shallow pools by the retreat of floodwaters and the drying up of seasonal rivers and other (artificial) water courses. Boys and girls often collect fish in this way during the dry season.

indovano, pl. **indovano** (9/10), gaffs (fish-hooks attached to a long handle), are also used. This name of this implement is derived from the Sangu verb stem *-lova*, 'to fish (in general)', but a special term (*-sipusa*) is also used to describe fishing with a gaff.

inkwaligo, pl. **inkwaligo** (9/10), is a kind of harpoon, made with a hollow reed or length of bamboo with a thread running through it and attached to an iron-hook. Fishing with these (which is described by the verb *-kwaliga*) is therefore a more specialised form of fishing by hook, rather than harpooning as such.

umuhomo, pl. **amahomo** (3/6), from the verb root *-homa*, meaning 'to pierce', is a fish-spear with a very long stem and simple iron point. Their use appears to be less common than gaffs.

imanga, pl. **imanga** (root *-panga*) (9/10), is a simple hand-operated basket-trap. This is placed over fish in shallow water, which are then extracted by hand through an opening in the wickerwork. I also saw one of these traps in Utengule being used as a makeshift cage for chickens.

umugonyo, pl. **amagonyo** (3/6) is a non-return basket-trap woven from twigs in the shape of a vessel with a narrow 'inverted' neck through which fish can pass but have difficulty in escaping. Unlike *imanga*, these can be left in rivers and periodically inspected and emptied of their catch. Wickerwork traps of this kind are widely use by Bantu-speakers in East Africa and called by cognate forms of the same name (e.g. Swahili *mgono*).

The Sangu use dug-out canoes (called *ishimun(y)umbwi,* 7/8, or *ishipugo*, 7/8) on the Great Ruaha and other sizeable rivers. There were, however, none in the Utengule area, and I assume that their use in fishing is restricted to a relatively small number of specialised fishermen in the north-east of Usangu. In and around Utengule few Sangu men specialise in fishing, though I knew of one seasonal fisherman who came from Uhambule to the south at the end of the rains in 1981 and remained in the village throughout most of the dry season. The seasonal abundance of fish and relative ease with which they can be caught means that a large number of people, including children, fish on an occasional basis. Traditional Sangu fishing techniques reflect this relatively unintensive pattern of exploitation. Although fish have always been caught and traded by specialised fishermen, for the majority of the Sangu population fishing is no more than a supplementary activity which adds to the variety of their diet.

New People, New Techniques

More intensive exploitation of the freshwater fisheries of Usangu appears to be closely linked to the large-scale immigration of rice farmers and others into the south of Usangu which began during the colonial period. In addition to the large number of Nyakyusa immigrants who fish on an occasional basis in the southern rivers, individual fishermen have moved further into the plains specifically to fish commercially. These include Wanji and Kinga from the Southern Highlands, as well as people from further afield. In 1981, for example, one well-known Fipa fisherman was living on an island in the Shimba-Shimba (an artificial channel which had earlier diverted the course of the Great Ruaha), and was said to have been there for the past ten years. Sangu informants were agreed that Wanji and Kinga had originally only fished in Usangu incidentally, while visiting for other purposes. By the 1960s, however, some of them were fishing the rivers of Usangu commercially, and the number of specialised fishermen has evidently increased since then.

It should be noted that the (agro)pastoralist immigrants in the north of Usangu have not played a significant role in this development, although they do compete with mixed farmers and fishers for dry season water resources. The Il-Parakuyu, like other Maasai, do not generally fish or eat fish, which they consider to be similar to snakes. Although some Sukuma do eat fish, many of them share a similar aversion, and in general they do not engage in fishing.

Sangu say that the Nyakyusa/Ndali and immigrant commercial fishermen have brought with them new methods of intensive fishing, and that this has resulted in overexploitation of the available fish resources. The new methods include:

The construction of large cross-river fish-traps. I saw one such barrier trap spanning the River Mkoji (below its confluence with the River Itamba) in September 1981. Traps of this kind were reported to have been introduced by immigrant fishermen.

The use of fish-poisons. In November 1981 a Nyakyusa fisherman and his wife were arrested by the village authorities in Utengule for putting fish-poison (of unspecified composition) in a pool in the dried-up course of the River Mambi. Cattle and people had drunk the contaminated water, resulting in the death of some cattle (including one which belonged to the Sangu village (CCM branch) secretary) and an outbreak of diarrhoea. An attempt to take the case further, however, was frustrated by the distance to the police post at Inyala and the police's demand that exhibits be produced and a specific accuser appear. Villagers assumed that the corruptibility of the police would not make it worth their while pursuing the matter further.

I did not record the use of nets in fishing,

though these are presumably used by some commercial fishermen. I did see small hand-lines being used in fishing near Utengule, but these probably contribute little to the kind of overfishing which results from the use of the methods mentioned above. It is quite likely that some Sangu fishermen have also taken up more intensive methods, though I did not hear of any who had during my time in Utengule. It appears that most of the commercial fishing in Usangu takes place much further to the east, in and around the Utengule Swamp, and further research should be required to determine whether or not the historical outline I obtained in Utengule also applies to this eastern area.

Conclusion

While the Sangu of Utengule were no doubt correct in ascribing increasing commercial exploitation to recent immigrants, the principal threat to the fish resources of Usangu probably now comes from other forms of human land use. The expansion of irrigated rice production continues to swallow up Usangu's wetlands, while the use of pesticides and herbicides on large state farms poses a direct threat to fish and other forms of aquatic life. The new rice scheme at Kapunga is blamed by some informants for the recent drying-up of the Great Ruaha, though other sources speculate that soil compaction and the modification of vegetation by cattle in and around the Utengule Swamp may have played a greater role in this.

Whatever the case, it is clear that the unique fish fauna of Usangu is under severe pressure from a variety of human activities of which commercial fishing is only one. Current proposals for the creation of a Usangu Game Reserve, stretching down from Ruaha National Park and incorporating the Utengule Swamp, may provide no more than a partial solution to the problem, especially if agriculture continues to expand and the rivers are overfished outside of the reserve. A lot of hard work lies ahead in exploring ways to manage the exploitation of Usangu's aquatic resources in a sustainable way. The Sangu may have achieved this when they were the principal inhabitants of the plains, but it will be no easy task among today's growing polyethnic population.

Acknowledgements

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KAKAMEGA FOREST IS DYING

Introduction

The value of Kakamega forest to Kenya has been evident to many people for a long time. We might reasonably infer that this precious resource, unique in Kenya, is therefore adequately protected against the ravages of man. However, forests may remain intact in law and on the map, while within they can be destroyed, and that is what is happening.

The Importance of Kakamega Forest

Kakamega Forest is unique in Kenya for its West African character and contains many species of both plants and animals not found anywhere else in the country. Because of its unique characteristics, the forest has been a field laboratory for biologists for a long time. The proportions of species of which this is true varies from group to group, but in those that have been studied (orchids, trees, amphibians, snakes, birds and mammals) between 10% and 20% of the species occurring in Kakamega forest occur nowhere else in Kenya (Diamond, 1979).

The avifauna of the forest is well known. About 199 species of forest birds occur here. Among the birds there is little endemism, apart from an endemic sub-species of Ansorge's Greenbul. However, the avifauna is rich and distinctive in composition, with many species such as Ansorge's Greenbul, Blue-headed Bee-eater, Chapin's Flycatcher and Turner' Eremomela, that are absent from all or most of the superficially similar mid-elevation forests in Uganda (Bennun & Njoroge in prep.). The forest also holds large populations of black and white colobus monkeys, red-tailed monkeys and substantial numbers of de Braza monkeys. The forest butterfly composition is very diverse and important both regionally, and continentally. The small mammal species composition of the forest is also very rich and shows strong affinities to the Zaire basin (Bennun & Njoroge in prep.).

General Conservation Problems

There is no doubt that Kakamega Forest is being cleared. Most of the destruction of the forest has taken place in the last 20 years, with the forest covering 3–4 times its present area before the second world war and twice that again two centuries ago (Kenya Wildlife Fund Trustees (KWFT), 1984). A survey of standing timber volume in 1991 showed that the forest had lost nearly 50% of its volume over the preceding 26 years, and that it would take at least 60 years to restore Kakamega's 1965 condition. This destruction was mainly caused by extensive commercial logging. The forest department also deforested parts of the indigenous areas, which were to be made into softwood plantations, for a proposed pulp mill. Indigenous, commercially valuable hardwoods were also planted. However, much of the natural forest was lost.

The human pressure on Kakamega is extremely intense. The area has a population growth rate of 2.8% per year, and is one of the most densely populated parts of Kenya. This makes protection completely inadequate over much of the forest. Extensive illegal extraction of fuelwood (*ca.* 100,000 cubic metres per year), charcoal, gold, timber, grass for thatching, lianas for ropes and

withes for baskets from Kakamega are estimated at KSh 100 million per year (Emerton, 1994). There is also hunting of wild animals by the adjacent communities. Forest and glade grazing legalised by a presidential decree passed in 1994, continues to prevent trees from regeneration and leads to policing problems.

Present Activities in the Forest

The activities in the forest are not new from the ones already documented. However, the intensity varies from one patch to another. I will give an account of the activities at the different patches of the forest.

Malava East and Malava West

Malava East and West are forest patches along the Kakamega-Webuye Road. They occupy an area of about 400 ha and 300 ha respectively. These two patches experience severe logging and what remains of the forest are scattered trees, next to the main road.

I encountered four active pit sawing and several sites of previous similar activity. At one site a stem of about 3 m circumference was on a pit saw. There was a track with visible wheel marks leading to the site. Several cut stems were also evidence and numerous sighs of previous cuttings. These activities were common on the weekends. It was normal to meet people carrying logs out of the forest (most of them run away when a stranger is noticed). Cattle were also used to ferry logs, especially at dusk. Several trails cutting through the forest facilitated these activities.

Buyangu and Kisere

Buyangu National Reserve (3,997 ha) run by the Kenya Wildlife Service, was established in 1985, and Kisere (471 ha) was upgraded to similar status, as a result of the proposal by KWFT (1984). The forest here showed little disturbance. The canopy was more closed and the understory more open. There was also good evidence of regeneration. However at Makhakha, I collected ten snares within a span of 30 minutes. I handed the snares to the KWS rangers, who I noticed patrolling the site the next day.

Isecheno

Isecheno Forest Station (310 ha) was mostly affected by charcoal burning, tree felling and partial logging. Five charcoal burning sites were noticed in the forest. The charcoal is sometimes transported by night by donkeys. Several cut stumps were also recognised with one incidence of pit sawing.

Several cattle tracks pass through this forest to the Kalunya glade. Most adjacent vegetation to the tracks is dead and little regeneration taking place.

Ikuywa

Ikuywa Forest covers an area of about 1000 ha. Here logging, charcoal burning and intensive firewood collection continues to reduce the forest stand. Charcoal burning is a very common activity. For every 1 km transect one encounters one or two charcoal sites. Once a *Celtis africana* of 2 m circumference was burning on a large clearing inside the forest. Vegetables, *e.g. sukuma wiki*, are planted on sites previously used for charcoal burning. I gathered that the locals prefer these sites because they are fertile and produce good vegetables.

Logging is also a common activity and *Croton megalocarpus* is favoured for this purpose.

Firewood collection is rampant, loads of firewood leave the forest every day. Most of this is sold at the markets along Kapsabet-Kisumu Road.

Yala Nature Reserve

Yala Nature Reserve (about 1000 ha) has a high closed canopy and a more open understory. It is relatively similar to Buyangu Reserve and Kisere. However, large numbers of cattle used the glade to the North. This has affected tree regeneration.

The latest development in the glade is the return of the "Shamba System". In late 1996, locals were being allocated plots in the glade for cultivation. This system, whereby farmers are encouraged to grow crops on clear felled land in return for protecting young trees planted by the Forestry Department, was tried in the late 1940s–1985. This failed and further eroded the forest. One wonders if it will succeed this time.

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Joseph O. Oyugi, Dept. of Ornithology, National Museums of Kenya, P.O. Box 40658, Nairobi, Kenya.

SIGHTINGS OF GOLDEN CAT *FELIS AURATA* IN THE ABERDARES

Over the years there have been several sightings of golden cat *Felis aurata* in the Aberdares. Some of these have been reported in this bulletin. Ian W. Hardy in the Sept./Oct., 1979 issue wrote of a sighting on 14 July, 1979 and more recently A.M.D. Seth-Smith in the March 1995 issue of his sighting on 1 Dec., 1994. The following two reports were received in late 1995. Nearly all of these reports were made of daylight sightings by experienced naturalists and seem to firmly point to the presence of golden cat in the Aberdares. Your Editors felt that it would be interesting for members to read about the recent ones as well as much earlier letter from Rupert Watson to Mike Clifton which was unearthed from old files of our former Editor, the late Mrs. Daphne Backhurst.

Dear Sir,

On Sunday, 7th October, 1979, at around 3:00 PM, I and Mr R. O'Miora of Nairobi were driving along a small forest track near the Kinaini River in the southern end of the Aberdare Forest when we both saw, very close to, what could only have been a golden cat *Felis aurata.*

We had actually driven up this track some three hours previously and on returning my companion saw the cat sitting on its haunches in the middle of the track, perhaps twenty to thirty yards in front of us. In fact, I only saw it after it had jumped up and was dashing into the forest.

It was very reddish-brown in colour and the most prominent feature of the animal was its stockiness.

The cat was not in view for long enough to confirm whether it had spots on its abdomen nor could one be certain if it had tufts on its ears or not, but Dorst and Dandelot in their *Field Guide to the Larger Mammals of Africa* are adamant that the Caracal *Felis caracal* is found "never in dense forest" and the animal was most certainly much larger than the African wild cat *Felis libyca* which would seem to be the

only other cat with which the Golden Cat could be conceivably confused, or perhaps the only other largely unspotted cat likely to be encountered at that height (over 8,000 ft) in that type of habitat

It is interesting that the sighting should occur so soon after Ian Hardy's report in the EANHS Sept./Oct. *Bulletin* of his sighting of golden cat in the Aberdare Forest.

Rupert W.M. Watson, Nairobi, Kenya

Dear Sir,

I am writing to inform you of a sighting of the golden cat *Felis aurata* that myself and two of my clients had during a safari in the Aberdare Salient area

We were camping at M2 campsite and were going out for a game drive on the 12th July, 1995. The time was 1800 h and we were approaching junction No. 8 from M2 camp. The cat ran across the road in front of us about 4 meters away. It crossed the road and paused before disappearing into the undergrowth. Unfortunately we had no time to photograph the animal but we examined it through binoculars for about ten seconds before it disappeared.

Visibility was good and we were able to positively identify the golden cat due to its size, (similar to the serval cat *Felis serval*) and the spotted underparts. I had some doubts as to what animal it was since I knew that the golden cat was not listed as part of the Aberdare fauna. However, the same evening the Senior Warden, Mr. John Muhanga was a guest of our camp for dinner. When I broached the subject of our sighting he informed us that Mr. Anthony Seth-Smith had also made a sighting some two weeks previously in the same area. (Editor's note: this would appear to be a different sighting than the one Mr Seth-Smith reported in the *Bulletin*.) I hope that the range for this cat can be enlarged to include the Aberdare mountain range.

Simon Belcher, Ker & Downey Safaris Ltd., P.O. Box 41822, Nairobi, Kenya

Dear Sir,

At the Ark On 6th January, 1995 at 8:25 pm, the night watchman on duty rushed up to me and asked me to go and identify a cat-like animal. So I went to see what it was. First when I saw it I thought if might be a caracal, but when I saw its head, its ears were short and rounded and when it jumped it's tail was of medium length and its colour was brownish-red. I went back to the book to see what it could have been. The only cat that fitted the description was that of the eastern golden cat.

James Cullen, no contact supplied.

IN SEARCH OF THE SHOEBILL *BALAENICEPS REX*: A SURVEY OF KIMONDI SWAMP, NORTH NANDI, KENYA

The Shoebill *Balaeniceps rex*, the only member of the avian family Balaenicipitidae, is a very large, blue-grey, stork-like waterbird. It has a huge, swollen bill tipped with a strong hook.

Shoebills frequent large fresh-water swamps overgrown with vegetation, grasses, reeds and papyrus (Brown *et al.* 1982). They occasionally perch on trees but normally roost in swamps. They are usually solitary and feed during the day on fish, frogs and water snakes. They hunt their prey by walking on aquatic vegetation very slowly and deliberately, often sinking up to

the tibio-tarsal joints or beyond even though their toes are elongated to give extra support. Most of their time is spent skulking among aquatic vegetation (Brown *et al* .1982) so despite their large size they may be easily overlooked. However, territorial birds make a brief survey flight over their patch of swamp in the mid-to late afternoon, and this can be the best way to detect their presence (J. Arinaitwe, pers. comm.).

Shoebills are endemic to the *Papyrus* and *Miscanthidium* swamps of Africa. The species is known to occur regularly in just eight countries: Sudan, Uganda, Zaire, Zambia, the Central African Republic, Ethiopia, Rwanda and Tanzania (Arinaitwe, 1994). Throughout its range its habitat is becoming fragmented and reduced, and the bird is listed as globally near-threatened (Collar *et al.* 1994) and regionally vulnerable (Bennun & Njoroge 1996). The total population is thought to be around 10,000 birds, but the species faces a variety of threats, including disturbance by humans and their livestock during the dry season when it breeds, swamp burning, rice farming and (less so than in the past) trade (Arinaitwe 1994). Birds maintain all-purpose territories of 2.5–3.8 km^2, so population densities are always low (Arinaitwe 1994).

The Shoebill's status in Kenya has never been clear. A record from the Yala Swamp (Britton 1978, 1980) was later revealed as a hoax (Parker 1984). However, it was thought that the bird still might formerly have occurred there periodically before much of the swamp was destroyed to make way for cultivation (Britton & Britton 1985). Records from Fourteen Falls and Shombole Swamp (Preston 1976) were discounted by Lewis and Pomeroy (1989).

Thus there was no confirmed record for Kenya until a single, apparently vagrant individual was seen in swamps in the Masai Mara Game Reserve and Amboseli and Nairobi National Parks between September 1994 and November 1996 (Kahindi 1994, Kent 1995, Davidson *et al.* 1995, Jackson 1996, Zimmermann *et al.* 1996). As a result of these published sightings, we received reports that the Shoebill occurs regularly in Kimondi Swamp in South Nandi, where it is well known to the local people (C. Tiong'ik, *in litt.*). In June 1996, therefore, we made a short survey in an attempt to confirm the presence of Shoebills in Kimondi Swamp and assess the swamp's suitability for sustaining a resident Shoebill population.

Study Area

Kimondi Swamp (0° 17' 42" N, 35° 04' 96" E), altitude 1800 m, is formed on the floodplain of River Kimondi, which flows south towards South Nandi Forest where it joins with River Sirua to form the Yala River. The swamp encompasses an area of about 10 km^2 and is highly convoluted with a network of small inflow streams. Papyrus *Cyperus papyrus* is the dominant plant, covering most of the slow-flowing open water. Open patches of water covered with water-lilies exist in some sections of the swamp. The papyrus swamps are fringed by flooded grasslands and mixed stands of *Typha* and *Scirupus*. The adjacent land is either intensively cultivated or heavily grazed. In some sections drainage of the swamp is in progress to pave the way for agriculture. The dominant agricultural crops in the area are maize and tea. Young boys occasionally fish with lines among the bridges.

Methods

From 17 to 19 July 1996, we walked around the perimeter of Kimondi Swamp. We actively searched for the Shoebill along the edges of the swamp and, wherever possible, further in. With the aid of the pictures in our field guides, we enquired from the local people whether, where and when they might have seen Shoebills at the site. We also

asked the local people to inform us of any Shoebill sightings while we were there. We also listed all the birds we encountered in the swamp and its adjacent areas. We made observations each day from 6:30–12:00 h and again from 16:00–18:30 h. Between 12:00 and 16:00 h we visited other swamps indicated on the topographical map of the area (Kabiyet 103/1) to assess their extent and status. During the entire survey the weather was cloudy, cold and wet with occasional rain during the day. It rained heavily during one night.

Results

We recorded 76 species of birds in the wetland and adjacent areas, including one regionally Vulnerable species (Great Egret *Casmerodius alba*) and three regionally Near-threatened species (Purple Heron *Ardea purpurea*, African Marsh Harrier *Circus ranivorus* and Grey Crowned Crane *Balearica regulorum*: see Bennun and Njoroge 1996). No Shoebills were seen. However, most of the local people that we interviewed were positive that the bird occurs in the area, though irregualrly. Older people said that the birds used to be common about 30 years ago, but have become rare of late. Several younger people claimed to have seen the bird within the past one or two years. Two of them claimed to have seen it within the past two months. Unfortunately, none of the records had exact dates or information on the habitat conditions at the time.

These records were given some credence by the fact that during our stay we received no false reports of Shoebill sightings, despite the fact that the local people came to our camp for information about birds in general.

Other swamps indicated on the topographical map close to Kimondi swamp are no longer swamps. All have been drained and cultivated, or converted to grazing fields.

Discussion

It is quite possible that the bird was overlooked due to the dense papyrus stands and the large size of the wetland. The lack of sunny weather might also discourage any Shoebills present from soaring or flying from one area to another, or in territorial survey. However, the size of the swamp may not be large enough to sustain a viable Shoebill population. Based on findings elsewhere (Buxton *et al.* 1978, Arinaitwe 1994) Kimondi could only support at most between two or four individual birds. It is possible that if Shoebills do occur, they may not be present all year round. This is supported by the fact that local residents say that they see it only rarely, for short periods, and not all the year round. Informants in Yala Swamp in 1969 painted a similar picture of its status there (Britton & Britton 1985). The lack of false reporting during our stay does suggest that the local people are familiar with the bird, and that it may be a rare but regular visitor to the site. Several informants promised to continue to look for the bird, so a follow-up survey may be made if a Shoebill does at some stage appear.

If Shoebills do frequent Kimondi, where do they come from? The nearest potential site is Yala Swamp, but there have been no confirmed sightings there either. The recent sightings in southern Kenya do show that the birds are potentially capable of long-distance movement or dispersal, even if they are generally considered sedentary.

Shoebills notwithstanding, as the last wetland of any size that is left in this area, Kimondi Swamp is a very valuable site. It requires urgent conservation attention if it is not to go the way of all its neighbouring swamps.

Acknowledgements
We are grateful to Mr Clement Tiong'ik for alerting us to the possible occurrence of the Shoebill in Kimondi, and to the local

residents of Kimondi location, especially the local chief and Mr Kiriamiti who guided us around the swamp. this survey was carried out as part of the Important Bird Areas programme for Kenya, supported by the Royal Society for the Protection of Birds through Birdlife Kenya.

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Oliver Nasirwa & Peter Njoroge, Ornithology Dept. National Museums of Kenya, P.O. Box 40658, Nairobi.

Short Communications

Serval Cat Sighted in Kakamega Forest

On the morning of 3 July, 1995 at 6:50 A.M. on my way to Isuikhu Study Site, I saw a serval cat. I was just to the South of Buyangu Hill in a forest glade when I saw a large cat along the road coming from the opposite direction. I grabbed my binoculars and had a good view of a large and spotted cat with a black-tipped tail. This fits a serval. A few moments later the cat detected me and crossed the road. I took foot print measurements (width=25 cm, length=40 cm) which again fits a serval cat according to Walkers *Signs of the Wild*.

This must be the first record of serval in

this forest which is an addition to the checklist of Kakamega Forest.

Mwangi Gathua, Mammalogy Dept. National Museums of Kenya, Box 40658, Nairobi, Kenya.

Notes on a Specimen of the Long-tailed Hawk.

The Long-tailed Hawk *Urotriorchis macrourus* is a little-known species of lowland Guineo-Congolian forests, recorded from Semuliki in western Uganda (Britton, 1980; del Hoyo *et al.* s994). Recently, Alan Root donated a specimen of this species (temporary number 960314 A) to the National Museums of Kenya. The bird had been given to Alan by Pygmies, who captured it, in Epulu, East Zaïre, in 1992. It had apparently been in a tree when it was felled. The bird survived some weeks then died. The frozen specimen was brought to the Museums, and I conducted a post-mortem examination on 27 March, 1996.

Post-mortem

The bird had no fat deposits and its muscles were atrophied, suggesting starvation. It weighed 475 g, but may well have weighed an extra 200–300 g when healthy. The left tarsus had swollen, probably associated with being tied by one leg.

The left pectoral muscle had a large necrotic lesion that penetrated both the pectoralis and supra-coracoideus, but not the sternum. The ovaries were inactive and barely located.

The lungs were over 80% covered with white patches similar to lesions caused by the fungus *Aspergillus fumigatus*. The air sacs looked normal, as did the liver and other organs. It seems likely that the bird was sick before it was captured.

Heart samples were stored in DMSO/salt for future DNA work.

Description

The species is aptly described by Brown and Amadon, (1968). This adult had a green iridescence on the back and wing coverts, and a rich rufous front beginning at the chin. The tail on this specimen measured 366 mm, the wing chord 300 mm; eye diameter was 13 mm, hind talon length 29 mm and inside talon length 255 mm. Brown and Amadon comment, "Except for the extraordinary tail, this genus would at once be merged with *Accipiter*". In every other respect this species warrants inclusion in that genus. The tarsus and toes are thick and exceptionally powerful, as are the skull and bill. In these respects it closely resembles *A. gentilis* (Northern Goshawk, Palaearctic and Nearctic), *A. henstii* (Henst's Goshawk, Madagascar) and *A. novaehollandiae* (Variable Goshawk, Australasia), rather than any other African *Accipiter*. The tail feathers have weak shafts and this flexibility allows the feather to be bent in an entire circle without fracture. The flight feathers appear softer than those of *A. gentilis* or the Great Sparrowhawk *A. melanoleucus*, and rather owl like.

Acknowledgements
Thanks to Alan Root for bringing this specimen to Nairobi and to Dr Leon Bennun of the Ornithology Department, National Museums of Kenya for kindly allowing the *post mortem*.

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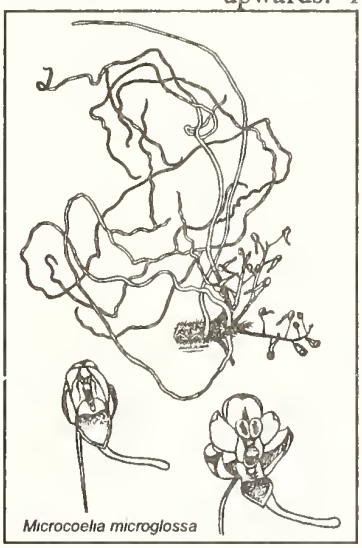
Simon Thomsett, Conservation Associate, The Peregrine Fund, P.O. Box 42818, Nairobi, and Ornithology Department, National Museums of Kenya, P.O. Box 40658, Nairobi, Kenya.

The "Moving" Uganda Spider Orchid (*Microcoelia microglossa* Summerh)

Microcoelias are leafless epiphytic orchids with short stems covered with scales instead of leaves. Roots are firmly or loosely attached to the substrate. There are some 26 species from Madagascar, tropical and southern Africa. The roots are spread in a way that they look like spider-webs with the short stem in the middle like a spider. Hence, the nickname of "spider orchid". The *Flora of Tropical East Africa* has a record of six species in Uganda, most of them occurring in forest habitat. *Microcoelia microglossa* in Uganda has been recorded in the forests of Budongo, eastern slopes of the Rwenzori Mountains and the forests of Bwamba, Bundibugyo district (Cribb, 1989). It is a leafless orchid with a short stem usually found attached to stems and branches of understory shrubs of the forest. The roots are said to be so well supplied with chlorophyll that they have taken over the function of the leaves (Piers, 1959) They also absorb nutrients from the air. The plant specimen observed "moving" was collected from Semuliki Forest National Park in 1992. Being without flowers and fruits, it was cultivated in a garden at Nansana near Kampala.


Microcoelia microglossa

At the time of collection, it was observed that the plants had been attached to the shrubs by their aerial root system in such a way that the plants were suspended in between like small spiders. Imitating nature, a string of sisal was tied between two small branches about 1 m apart. The plants were placed along the string with their roots dangling straight down. After a month or so, the roots had begun to grow in a twisting, looping manner. By the end of the year they had entangled together resulting in a confused mass. The sisal string gave way and new roots started appearing and later the plants flowered one after another. The new roots grew towards neighbouring branches and attached themselves thereon. The general direction of growth was upwards. The old plants died off gradually. By the end of two years, the plants had "moved" over a distance of 30 cm. This process is repeated annually and the "movement" continues as long as old roots die and new ones take up new positions bringing the small plant with them.

In the plant's natural habitat, it is usually found attached to the lower branches of *Acalypha ornata* and *A. neptunica*. These lower branches often die and fall to the ground together with the orchid. The orchid then develops new roots which grow upwards until they touch living branches, thereby "moving" the whole plant with them.

It was noted that this orchid most often grows in small shrubs beneath dense cover in closed canopy forest and so depends on flecks of light filtered through the leaves of the trees and shrubs above it. It is never abundant, found only in pockets of rain forest and its cultivation has failed to produce seed, meaning that there are special insects on which it depends for pollination and which may only be found in those forests where it grows. Therefore, with the destruction of tropical forests, *Microcoelia*

microglossa, with its particular needs of substrate, light and pollinators, will have little chance to survive.

A.B. Katende, Botany Department, Box 7062, Kampala, Uganda.
Orchids by David Kato

Joint KEFRI-FD National Conference on the State of Forest Research and Management in Kenya, 3rd–5th June, 1996

The Kenya Forest Research Institute (KEFRI) was formed in 1986, and in the ten years since then its research has greatly advanced Kenyan forestry. Two major changes facing KEFRI and the Forest Department (FD) were highlighted at the KEFRI-FD National Conference on "The state of Forest Research and management in Kenya", marking KEFRI's tenth anniversary. The first is the increasing demand for wood products, in particular firewood. The second is that Kenyan forestry is increasingly realising the importance of socially and environmentally sustainable use of the forest.

A number of ideas were proposed to help adjust to these changes. The proposed new Forest Policy puts greater emphasis on efficiency and sustainability. Several speakers noted how a return to the "shamba system" would be a useful and popular move. An entire session was devoted to Forest Training and Extension. Speakers were frank and perceptive in confronting the problems facing Kenyan forestry.

On the down side, however, the session on Environmental and Biodiversity Conservation paid very little attention to the importance of indigenous forests for biodiversity conservation or even utilisation, as was pointed out very clearly in the panel discussion. In comparison to indigenous forests, plantations are of negligible value for biodiversity.

The conference was well organised and well attended, including a good number of district Forest Officers, a good sign that the findings of the conference will filter down to forest managers. Most of the 36 presentations acknowledged the changes facing forestry in Kenya and proposed measures to deal with them. This was undoubtedly encouraging, and the emphasis placed on social forestry, extension, multiple-use forestry, and soil and water conservation indicates that these proposals will be sincere. We only hope that a similar emphasis will also be placed on the importance of Kenya's remaining indigenous forests.

Thomas Brooks and Edward Waiyaki, Ornithology Dept., National Museums of Kenya, P.O. Box 40659, Nairobi, Kenya.

Field Trip Report

EANHS Outing to Mount Donyo Sabuk, Sunday 22nd September, 1996

Donyo Sabuk is only about 45 miles from Nairobi, but it is quite surprising how few of Nairobi's residents have ventured to visit this lovely park.

The road all the way from Nairobi via Thika to the park turn-off is excellent (about 40 miles). Thereafter it is a bit dusty and rough in places. One passes by Fourteen Falls and crosses the Athi River on the way to the Park gate. The usual Category "D" Park fees are payable to the very pleasant KWS staff at the gate and the ascent of this 7041 ft mountain is made up a fairly rugged track to the top. Half way up are the graves of Sir Northrop and Lady McMillan and that of their faithful servant Louise Decker. The sigh post to the graves indicates "Lord

McMillan's grave"—but he wasn't really a "Lord".

At the top of the mountain are some lovely green areas and a shady picnic tree. You may walk about and of course admire the birds, wild flowers and scenery (on a clear day Mount Kenya and Mount Kilimanjaro). there are monkeys about and the occasional antelope and be careful to keep an eye open for buffalo.

I would suggest that for peace of mind it might be advisable to procure the services of a Park Ranger to accompany you if you are not a large party. Security has been a problem in the past but on our expedition all was serene.

The Park is very well tended and tidy with no signs of litter, and the paths, clearings and picnic site very neat.

Birds were not profuse but an abundance of *Leonotis* attracted Amethyst, Golden-winged, Bronze and Variable Sunbirds. Hartlaub's Turacos were heard calling and an itinerant falcon showed itself near the radio masts. A pair of Crowned Eagles put in a vociferous appearance high above us and let us know that this was their territory. Other birds seen were Black Saw-wing, African Citril, Long-crested Eagle, Common Bulbul, Tropical Boubou, White-eyed Slaty Flycatcher, Northern Double-collared Sunbird and Common Waxbill.

Some of our party negotiated the ascent in a saloon car, but I suggest a 4-wheel drive would be more appropriate.

All in all, a nice days outing.

Fergus J. McCartney, P.O. Box 4592, Thika.

Remembrance

Ken Bock

Ken Bock was born in King William's Town in South Africa and spent his youth in that country. In 1949 he went to Britain and took an Honours degree in Botany at Imperial College of Science, University of London, graduating in 1953. Following his graduation he was accepted as a Scientific Officer in HM Overseas Research Service, with a posting to Kenya to join a team working on Coffee Bean Disease at the Scott Laboratories, now National Agricultural Laboratories, at Kabete near Nairobi. Tnere was, however, some delay before this career job began and in the interim, 1954 to 1955, Ken joined the International Red Locust Control Service, helping out with locust research in Tanganyika (now Tanzania). It was here, in company with other dedicated naturalists, that Ken began his lifelong commitment to the understanding and conservation of Africa's flora and fauna.

Ken worked in Kenya as a plant pathologist until 1963, mainly on coffee diseases, and during that time obtained his Doctorate from the University of London. In 1963 he transferred to East Malling Research Station in Kent, UK, and remained there for three years during which time he made major discoveries which led to the development of good control measures against virus diseases of hops.

East Africa called, however, and in 1966 Ken returned to Kenya as Research Virologist with the East African Agriculture and Forestry Research Organisation (EAFFRO) at Muguga. He became Head of the Pathology and Nematology Division which included the East African Plant Quarantine Station. During this period, in collaboration with the Scottish Corps Research Institute (SCRI), Dundee, Scotland, he was involved in the isolation and characterisation of maize streak virus and African cassava mosaic virus.

With the changing political situation Ken transferred to the UK Overseas

Development Administration (ODA), and, still at Muguga, became Project Leader of the ODA Crop Virology Project at the renamed Kenya Agricultural Research Institute for the Semi Arid Tropics (ICRISAT). He was later posted to the Chitedze Research Station near Lilongwe in Malawi as Team Leader working on groundnut diseases and viruses in the SADCC countries of southern Africa. The programme he initiated there, again in collaboration with SCRI, has continued until the present and is now showing significant success. Ken retired from ICRISAT in 1989 and returned to Kenya to live at the coast.

This bald summary of Ken's career tells little of his abilities. He was a meticulous and very successful researcher, who worked on many crops including coffee, sisal, coconuts, maize, cassava and groundnuts, and many minor crops. His work on hop viruses in UK was regarded as outstanding. He was an enthusiastic and dedicated scientist and was able to pass this enthusiasm to his work team. Many Kenyan scientists acknowledge the help and encouragement they received from Ken Bock during the early days of their careers.

Not long after his arrival in Nairobi Ken met Betty Bruce, at Scottish country dancing and they married in 1956. They had two sons and a daughter and were a very close and happy family, enjoying the advantages of their rural home at Muguga, where Ken created a magnificent garden, and holiday trips to Kenya's wild places and, particularly, to the coast at Diani.

This then brings us to Ken's parallel career. He was deeply and passionately interested in all aspects of natural history, and kept meticulous record of observations of plants, birds and animals. The real love, however, was for the coast, the reef and the reef fish. This affair began very early and continued until his death. For a number of years the family holidayed at the coast and the identification of the fish and the study of the populations on the reef and in the lagoons at Diani went on from year to year. This resulted in the publication, in 1978, of the book *A Guide to the Common Reef Fishes of the Western Indian Ocean*. This guide has been reprinted by Macmillan Press four times and is still on sale and much used by tourists. These interests were of necessity in abeyance during his stay in Malawi, but even there the great complex of Chiclid fish in Lake Malawi received some attention and Ken found an outlet for his energies in support and encouragement to the Lilongwe Branch of the Wildlife Society of Malawi.

On his retirement, back to the Kenya coast, the interest in the reef continued and Ken became highly involved with the conservation of the reef habitat and the impact of tourism, and all that follows, on the fish and coral populations. He was able to provide the Kenya Wildlife Service planners with much basic information which helped them to decide on the most important areas to be included in Marine Parks and Reserves, mainly on the coast south of Mombasa. He had again, as in his formal career, very good relationships with inexperienced wardens assigned to deal with marine matters, even teaching some of them how to swim and to become familiar with the marine environment, and his wise counsel will be greatly missed.

Because of his stimulating and optimistic outlook on life he was able to make even dull subjects interesting and was in frequent demand as a lecturer on natural history subjects. Perhaps his best known contributions in recent years have been annual lectures on the coast, the reef and the fish at the Know Kenya Course, sponsored by the Kenya Museum Society. He also contributed articles on reef fishes of Diani to the *JEANH*, one of which will be published posthumously in the next issue.

Ken's very active retirement was restricted by the diagnosis of cancer about

two years ago, and treatment was initiated and suffered cheerfully and with optimism. He had revised his 'fish book' and was looking for a publisher, and had completed the manuscript for a 'Guide to the Reef Fish of the Kenya Marine Parks and Reserves'. He continued with the development of a new garden, planting indigenous trees, including figs, another absorbing interest, around a new house at Waa, to which he and Betty had moved in mid 1995. Ken died, of an inoperable brain tumour, peacefully in UK on 23rd June 1996 at his daughter's house with all the family around, having laughed and reminisced with close friends that very day. Ken was a very good friend to many and will be greatly missed, and I would like to express sympathy and condolences to his widow, Betty, and to all the family.

Ian A.D. Robertson, Box 162, Malindi, Kenya.

Notices

The Uganda Forest Department Biodiversity Report Series.

The 33 Biodiversity Reports present the results of the first systematic work to document the biological diversity represented in Uganda's major reserved forests. The reports describe fieldwork carried out by the Forest Department between 1991 and 1995, aimed at listing the trees and shrubs, birds, butterflies and moths, and small mammals of the country's 65 most important conservation forests. The purpose of this work is to provide necessary data on the biological value of different forests and establish clear priorities for the designation of new forest Nature Reserves and other conservation areas.

Each report in the series provides a summary of the data collected at one major forest, or a group of similar adjacent ones. The primary purpose of presenting the data in this way is to provide a permanent record of the findings as a basis for later comparative work between sites, and as a baseline for long-term ecological monitoring within Uganda's forests.

The Biodiversity Report Series demonstrates Uganda's commitment to biodiversity conservation and makes a major contribution towards addressing the country's obligations under the International Convention on Biological Diversity, signed in Rio de Janeiro in 1992 and ratified by Uganda Government in September 1993.

The reports will be available by the end of 1996 from the Uganda Forest Department, P.O. Box 1212, Kampala, Uganda.

Request for Orchid Materials

I am currently researching the embryology and symbiotic seed germination of some Kenyan species of the Orchidaceae for my Ph.D. degree. My work targets the subfamily Epidendroideae *sensu* Dressler (1933) My main specimens are the fruits at different developmental stages. In a year of field work I have obtained most species , but have failed to collect specimens of *Bulbophylum*, *Vanilla*, *Acampe* and *Solenangis*. I would be grateful to anyone growing any of these in Kenya who would supply me with the fruits. I am able to pick the specimens myself from wherever they occur. Please contact me on 0151-22646 ext. 2334 and leave a message with the secretary.

John Ochora, Jomo Kenyatta University of Agriculture and Technology, Department of Botany, Box 62000, Nairobi.

MEMBERSHIP

This offers you free entry to the National Museum, Nairobi; free lectures, films, slide shows or discussions every month in Nairobi; field trips and camps led by experienced naturalists; free use of the joint Society-National Museum Library (postal borrowing is possible) and a copy of the *EANHS Bulletin* every three months. The Society organises the ringing of birds in eastern Africa and welcomes new ringers. It also runs an active Nest Record Scheme. Membership rates are given below.

JOURNAL

The Society publishes, in collaboration with the National Museums of Kenya, the *Journal of East African Natural History*. The *Journal* is published twice a year. Contributions, typed in double spacing on one side of the paper, with wide margins, should be sent to the Editor, Box 44486, Nairobi, Kenya. Authors receive twenty-five copies of their article free.

EANHS BULLETIN

This is a printed magazine issued four times a year, which exists for the rapid publication of short notes, articles, letters and reviews. Contributions, which may be written in clear handwriting or typed, should be sent to The Editor (EANHS Bulletin), Box 44486, Nairobi, Kenya.

SCOPUS

The Ornithological Sub-committee publishes this journal three times a year, cost KSh. 600 per annum. All correspondence to D.A. Turner, Box 48019, Nairobi, Kenya.

BALLYA

This bulletin is published three times a year by Succulenta EA, a division of the EANHS. Members of the EANHS can join Succulenta EA, at a cost of KShs 400 per annum, and receive *Ballya*. Contributions for *Ballya* can be sent to Edward Vanden Berghe, Box 44486, Nairobi, Kenya.

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*Only children under 18 and full time university undergraduate students. Graduate students must register as full members.

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